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PREDICTION OF ADJUSTMENT TO THE ANTARCTIC

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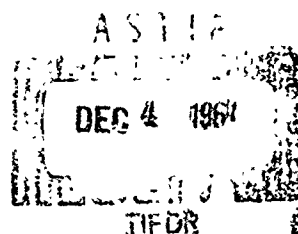
Benjamin B. Weybrew,

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and

Richard P. Youniss

XEROX



Bureau of Medicine and Surgery, Navy Department

Research Project MR005.14-2100-3.05

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U. S. Naval Medical Research Laboratory Report No. 350

Bureau of Medicine and Surgery, Navy Department,

Research Project MR005.14-2100-3.05

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SUMMARY PAGE

THE PROBLEM:

To examine the efficiency of psychometric and interview data in predicting individual differences in adjustment to the Antarctic.

FINDINGS:

Some of the characteristics of those men who adjust most adequately to the Antarctic conditions are: to have high intelligence test scores, to have control of hostile and aggressive impulses, to be single and over 25 years of age, and to have less than a college level of education.

APPLICATIONS:

For workers in personnel selection, the results of the study provide a list of predictive information of use in evaluating persons for hazardous duty similar to that found in the Antarctic.

ABSTRACT

↓
The predictive validities of several psychometric tests as well as trait ratings by teams of psychologists and psychiatrists were examined with respect to criteria of adjustment to the Antarctic during the "wintering-over" period of 1957. Thirty-three subjective symptoms reported monthly together with three other attitudinal criteria were intercorrelated and factor analyzed. The total N was 109. Using factor scores computed for each of the five factors extracted from this matrix as adjustment criteria it was found that men with the following characteristics had the greatest adjustment potential for the Antarctic conditions: high intelligence test scores, low interest in organized sports, rated high with respect to "ability to communicate", low with respect to "overt hostility", high with respect to "ability to cope with aggression", to have less than a college education, to be single and over 25 years of age, and to have come from the southern section of the U. S. The methodological importance of the application of factor analytic techniques to repetitively collected subjective data is emphasized. ↗

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PREDICTION OF ADJUSTMENT TO THE ANTARCTIC

INTRODUCTION

The purpose of this study is to identify possible predictors of personal adjustment to the Antarctic environment. DEEP-FREEZE '60, as the Antarctic mission for 1960-61 is called, is already underway, making the number of men who have been assigned to the South Polar regions in the past five years approach the three-thousand mark. Subsequent to the first DEEP-FREEZE mission in 1955, only a small amount of literature pertaining to the various aspects of the problem of personal adjustment in Polar and isolated environments has been published (1, 2, 5, 6).

The reasons for this relative scarcity of psychological and psychiatric research reports with respect to this problem are not difficult to ascertain. First of all, the men, both military and civilian, who are assigned to the Antarctic stations are volunteers many of whom more or less passively resist any attempt to interrogate and systematically observe them in the Antarctic situation. Secondly, and of equal importance, is the fact that the administrative staff of the various Antarctic outposts are somewhat reluctant to impose any testing or observational schedules upon the day-to-day routines of the men. The last mentioned limitation to research of this kind in the Antarctic situation would seem to be understandable since reliable data pertaining to attitudes and attitudinal change, psychiatric symptomatology and so on can be accurately obtained only from lengthy testing procedures and/or time-consuming personal interviews.

Original planning of the study included provisions for the collection of peer nomination data, a battery of personality tests, both projective and objective, of various types and personal interviews to be conducted by psychologists and psychiatrists at the various stations after the IGY had reached the halfway mark. As it turned out it was impossible to implement these

somewhat elaborate observational techniques in systematic manner. As a result of the fragmentary nature of the data that were collected, only a small amount of it could be employed in this preliminary study. However, there was one additional source of data collected by means of a so-called Monthly Health Diary obtained from each man. These diary data, although of unknown validity and reliability, suggested some possibilities as a source of criterion information. To quote Rohrer, who observed the data being collected by means of the Monthly Health Diary at Little America (6), "The Questionnaire was well prepared and had considerable information that would be useful in making psychological interpretations".

This study therefore relies heavily on the data obtained from these diaries mentioned above. Very briefly, the Monthly Health Diary was designed to provide a systematic record of each man's self-reported behavioral symptoms, feelings, moods, and habits. The dental officer supervised the administrative diary at the outset of the voyage to the Antarctic. The respondent was to check the degree to which each symptom or descriptive category applied to him each month of his stay in the Antarctic. The diaries were kept in the dental office and checked by each man at the same time his monthly dental condition was reviewed. It was the opinion of the dental officer (6) that during the successive measurement periods the men responded quite frankly and conscientiously to each of the items on the diary. It is felt that the fact that the respondent was assured the information disclosed in the diary was kept in strictest confidence by the dental officer and would be used only for research purposes in the States, probably resulted in more frank and accurate self-descriptions than are usually obtained under similar circumstances.

At the outset of the study a decision was made to focus upon one particular station in the Antarctic rather than to combine

Appendix I contains a sample Day Booklet. It should be noted that the Diary also contained items pertaining to dental health. These data are deleted from the booklet in Appendix A.

similar data obtained from all of the six major Antarctic stations. This decision was made after sampling from several of the stations and determining in a gross manner that the data were quite discrepant from station to station. Such discrepancy was probably due to differences in the opportunity to collect this type of data and perhaps also to differences in the attitudes of the administrative staffs toward research of this kind.

Accordingly, it was decided to focus upon the data collected by Dr. Robert Adams DC USN at Little America during the "wintering-over" period of 1957. This one station was selected largely because the data were more complete and, insofar as could be determined, were quite carefully collected. One result of fractionating the data in this manner however, was to reduce the size of the group of men from whom criterion data were to be obtained to a group of 109 civilian and military personnel combined.

There are at least two studies which should be reviewed as background for this one. As was the case in the study by Rohrer (op. cit), the study by Mullin and Connery (5) was based upon observations made from interviews at one or more Antarctic stations.

In the latter study the personal interviews conducted with five officers, nine civilians and twenty-five enlisted men resulted in the following impressions: (1) There was a relatively high frequency with which scapegoat tactics were employed as a means of hostility reduction, (2) nostalgia and boredom did not seem to be important in the person's total adjustment; (3) the so-called "big eye" or insomnia did not seem to occur except in the winter season; (4) problems in the sexual sphere, while apparent, did not seem to be excessive; (5) frequency of headaches increased especially among the scientific personnel; and (6) psychosomatic complaints were relatively infrequent. Of special note according to the impressions from these interviews was the reported difficulty with memory and concentration. To quote from this publication "this impairment of memory, alertness or awareness was a rather striking phenomenon and requires more study."

Insofar as is known at this time, there has been no systematic attempt to evaluate the predictive validity of tests and other information obtained before the onset of the Antarctic duty. There have been, however, a number of studies by the Air Force in connection with the Arctic Camps, for example (1, 2). The most recent study of this kind was published in 1959 (2) and employed a diverse battery of tests, among them a Biographical Inventory, the Self-appraisal Blank, Incomplete Sentences Test, Taylor Manifest Anxiety Scale, a Food Aversion list and others. This battery was administered to the groups stationed at eight Arctic bases. In addition, peer nomination data were obtained from the same subjects as a means of identifying groups of "well-adjusted" and "poorly adjusted" men. The results indicated that the score distributions from the Self-appraisal Blank, Incomplete Sentences Test, the Airmen Classification Battery, and such data as frequency of sick-call visits were all significantly different between the two criterion groups. One limitation of this study was that the predictor data were collected in the Arctic. To quote directly, "The extent to which similar measures collected prior to Arctic assignment would be predictive of adjustment is not answered by these data".

Unlike the study mentioned immediately above, the predictor data for the present study were collected at the Naval Construction Battalion Center, Davisville, Rhode Island about two months before starting the trip to the Antarctic. These data which will be discussed in detail in the procedure section to follow, were obtained by means of projective tests, psychiatric interviews, and objective tests of several types. The goals were to evaluate the predictive efficiency of scores obtained from these tests, along with interview materials, in terms of individual differences in the quality of adjustment to the Antarctic conditions. Obviously the outcome of such a study depends a great deal on the accumulation of reliable and valid criterion information regarding individual differences in overall adjustment to the Antarctic condition. With the exception of supervisory ratings completed

after four months at Little America, the criterion information employed in this study consisted for the most part of derived measures obtained from a factor analysis of the trends in the symptom data obtained from the Monthly Diary. The estimates of the validity of the predictors obtained at Davisville were derived from the correlation of predictors with factor scores. These factor scores were obtained from the factor analysis of the inter-item correlation matrix derived from the Monthly Diary, together with the three additional criterion measures².

In order to place this study in proper perspective, it might be well to indicate our working definition of the term adjustment as used in this study. In the study mentioned above (2), the authors defined adjustment as "effectiveness on the job and the ability to get along with others. The measure of ability to function in the Arctic

was rated by immediate supervisors". For the purpose of this study, adjustment was operationally defined by a factor score derived from the loadings of the monthly Diary items, a supervisor rating, an Attitude Questionnaire Score, and by a Group Behavior Indicator³. Our criteria therefore were based upon the quantity and severity of symptoms presumed to be indicative of individual differences in adjustment to the Antarctic conditions.

In short then, the goals of this study are to examine the predictive relationship of various kinds of observations, obtained prior to the Antarctic assignment, to patterns of symptoms or indicators presumed to be indicative of individual differences in the quality of adjustment to the existing conditions in the Antarctic. Obviously these findings are exploratory in nature and cannot be generalized to other than very similar predictive problems.

PROCEDURE

SUBJECTS

The number of men participating in the study was 109 (18 civilians and 91 military) all of whom were stationed at Little America. Fifty-five percent of the group were single, 38 percent married, and the remaining 7 percent divorced or separated.

Thirty-two percent of the group had some college training, 66 percent were high school graduates and the remaining 2 percent had only a grammar school education.

The distribution of ages of the group is presented in Figure 1.

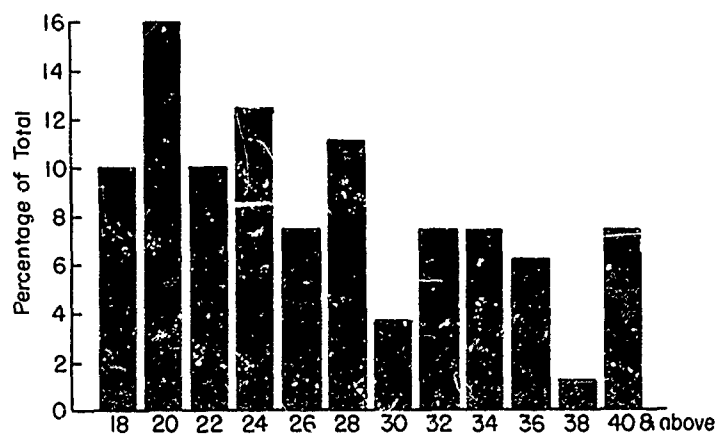


Fig.1 Distribution of Ages Plotted by Midpoints of Intervals

² The particular tests and observational techniques employed at Davisville were selected and developed by Dr. H. ZIMMER, principal investigator under contract by the Office of Naval Research. All criterion measures will be discussed in the procedure section to follow.

Examples of the supervisor rating called Line Evaluation Study, the Attitude Survey Scores, and the Group Behavior Scores are contained in Appendix A, B, and C in the order of discussion of them is contained in the procedure section of this paper.

Unfortunately, accurate information as to age was available for only 81 of the men; however, this sample is assumed to be representative of the total group. The total range of the distribution is 18-56, with a Mean and S.D. of 27.6 and 7.4 respectively.

Information items concerning the type of community from which the volunteers came and its geographical location are contained in Tables I and II in that order.

TABLE I
TYPE OF COMMUNITY FROM WHICH THE
VOLUNTEERS CAME

TYPE	PERCENTAGE*
Farm	25.0
From country, but not farm	6.3
Village, less than 2,500	11.3
Small city (2,500-25,000)	21.3
Medium city (25,000-100,000)	15.0
Large city (more than 100,000)	21.3

*Complete data were available for 80 volunteers.

TABLE II
GEOGRAPHICAL LOCATION FROM WHICH
THE VOLUNTEERS CAME

LOCATION	PERCENTAGE*
New England	14.2
Northeast	19.4
South Atlantic Coast	10.3
North Central	23.2
South Central	12.9
Southwest	6.5
Rocky Mountain	5.2
Pacific Coast	7.7

*Accurate information was available for 77 men.

Predictor Measures

1. **Background Information.** These data were collected by means of the Standard Psychodiagnostic Record Booklet published by the Medical Psychological Research Corporation. The only information used from this booklet pertained to sociological and actuarial data for each subject. No attempt was made to utilize such data as religious background, parental attitudes, work history and the like in this study. It might be well for future studies to examine some of the additional data in this booklet in terms of its predictability with respect to the criteria at hand.

2. **The Shipley Hartford Scale.** This test published by the Institute of Living, Hartford, Connecticut has been shown empiri-

cally to have useful validity for identifying certain kinds of psychopathology involving organicity. A Verbal and an Abstraction score are computed from the responses on the test. A third score consisting of the ratio of the verbal to the abstraction score is most frequently used. This score is called the Conceptual Quotient. All three of these scores were computed for the majority of the population sample and were correlated with the criterion data available.

3. **Psychiatric Ratings.** Each man received a personal psychiatric interview directed toward an assessment of the general psychiatric status of the person at the time of the examination. Based upon these interview impressions, psychiatrists then rated each man with respect to eight somewhat global categories as follows: Potential Effectiveness for Operation Deepfreeze, Ability to Function in a Group, Ability to Communicate, Ability to Withstand Stress, Ability to Cope with Depression, Ability to Cope with Aggression, Expression of Overt Hostility and Expression of Overt Anxiety. These ratings with the exception of the rating as to potential effectiveness for Operation Deepfreeze were made on a four-point scale. The rating with respect to Potential Effectiveness for Operation Deepfreeze was made on a five-point scale extending from "unacceptable" to "outstanding," (See Appendix E).

4. **Ratings by Psychologists.** A group Rorschach with individual inquiries was administered to the candidates included in this sample. The judgments as to the general psychological status of each subject were determined by the psychologists participating in the assessment program from the Rorschach to patterns and from impressions obtained during the personal inquiry. These impressions were transferred to the same rating format as employed by the psychiatrists participating in the program. (See 3 directly above).

5. **Combined Psychiatrists' and Psychologists' Ratings.** Following the personal psychiatric interview and the personal inquiry associated with the Rorschach responses given by each subject, pairs of psychiatrists

and psychologists "pooled" their impressions and determined a composite rating for each man using the same rating format as described in 3 and 4 above. This was done after the psychologist and psychiatrist of each pair had completed the ratings independently.

6. **Sports Inventory.** This inventory was developed by the staff of the Mediopsychological Research Corporation. It consists of 50 multiple choice items pertaining to factual information associated with various kinds of organized sports. A scoring key was derived after consultation with sports writers in the New London area. The consensus of opinion of the consultants was that 32 of the 50 items could be answered unambiguously, therefore a summed-score key consisting of the number of right choices for 32 items was computed for each man in the population sample. A split half reliability estimate (odd-even) was found to be .75 suggesting adequate internal consistency of the items included in the key. A sample of the questionnaire booklet is contained in Appendix D). The keyed items are indicated by an asterisk before the item number and the correct alternative by a circle around the accompanying number.

7. **Neurotic Symptom Checklist.** Twenty-one symptom-like items were responded to by YES or NO in terms of whether they were applicable to each man. Similar to the Cornell Index, this questionnaire was designed to estimate the frequency and severity of neurotic traits. The score used in this study was computed by summing the number of "yes" responses to 16 selected items. (See Appendix G for a sample of the questionnaire; the numbers of the keyed items are circled).

CRITERION MEASURES

1. **Monthly Health Diary.** Multiple category rating scales were constructed for 66 different items. Space was provided in the rating booklet to check the category most applicable for each of the 12 monthly periods. The Dental Officer retained the test booklets throughout the tour. He allowed the men to rate the items in the

booklets each month, at the same time the man underwent dental examination. It is to be noted in the sample booklet in Appendix F that for the most part only the items pertaining to the psychiatric status of the person are included. The items pertaining to the dental health of the men have been deleted. It is noted in the example of the rating booklet in Appendix F that the months are numbered from right to left with the first month rated on the extreme right of the rating format and the last on the left. This procedure was followed so that the preceding monthly rating could be "clipped" off during the interim between the rating sessions thus preventing the ratee from reviewing his preceding monthly rating on a given item. The rationale involved here was that a man knowing his previous monthly rating would hesitate to report a judgment deviating greatly from his own average. Although the rating data will be discussed in the results section of this paper, it is well to point out that the analysis of the data involved the computation of means for each monthly session for each item that could be logically scaled. With the exception of the first three months, the size of the sample for a given month averaged about 90 percent of the total group. The data for the three months consisted of ratings from approximately 50 men.

2. **Line Evaluation.** It had been planned to ask for evaluations of the men by means of the Line Evaluation Form each four months of the tour in the Antarctic. Unfortunately, only one rating was available for each of the men. This rating was made by supervisory officers between the fourth and seventh month at the station. As is seen in the example form contained in Appendix A, the format of the rating sheet consists of a scale extending from poor to outstanding in terms of overall performance of duty, seven multi-category items and two open ended items all pertaining to certain aspects of performance or to any outstanding traits observed. Since the seven multicategory items would not empirically scale, it was decided to use as criterion data only the overall performance rating. How-

ever item #6 pertaining to the presence or absence of disciplinary problems was thought important enough to be included as criterion information since such information may in fact be acting out behavior which may be a symptom of maladjustment. Consequently a coding system was constructed for item #6 so as to categorize the disciplinary problems that occurred and to allow a frequency count of each. These data will be discussed briefly in the results section.

3. **Attitude Study.** This questionnaire consisted of 60 items to be responded to self-ratings by each man. The content of the items (see Appendix B) is varied, demanding subjective judgments regarding certain aspects of the mission of concern to the individual. Accordingly, it is noted that the items pertain to attitudes toward the quality of food, the prevalent moods, the uncertainties about having volunteered for the duty, how strongly he wishes to return home, and many items pertaining to his general comfort such as the quality of the shelter, the recreation, and so on. Two psychologists⁵ independently made judgments as to the directions of the five-point scale to each item in terms of the degree of positiveness of the attitudes toward the mission in general. Thus for item one, "Do your present duties employ your abilities in the best way for accomplishing the mission of this expedition?" The choice "positively" was weighted 5; "probably" 4; "undecided" 3; "probably not" 2; and "positively not" 1. Only those items upon which both raters agreed as to the direction of the scale were included in the item

analysis. This analysis consisted of computing the item-total correlations. The items whose correlations reached the 5 percent confidence level were then included in the second key and the process reiterated. The numbers in front of the keyed items in the appendix are circled, and the response category with a weight of "five" is also checked in the booklet in the appendix. The internal consistency reliability using an odd-even breakdown was also computed for the scores obtained by the use of this key. This estimate of the reliability corrected by the Spearman-Brown formula was .94, thus indicating satisfactory internal consistency of the items making up this key.

4. **Group Behavior Description.** This questionnaire (see Appendix C) consisted of 43 items similar in structure to those making up the attitude study discussed immediately above. A similar approach was used to obtain a keyed score for this questionnaire also. Again the same two psychologists independently rated the direction of each item; item total correlations were computed twice and a final summed score was obtained. As for the case in the questionnaire immediately above, the sample booklet in the appendix shows the keyed items circled and the response category with weight five checked. The split half reliability corrected as above was again satisfactorily high; .94. As may be seen by a cursory examination of the content of the items in the sample booklet in the appendix, the total score apparently taps interpersonal attitudes in general and attempts to evaluate the overall cohesiveness of the group participating in the program at the Antarctic station.

⁵ Two of the authors of this paper, Weybrew and Younis.

METHOD OF ANALYSIS.

When an attempt is made to evaluate the predictive validity of an assessment device such as a test or observations made during interview, it is crucial to estimate in one way or another the reliability of the criteria against which the predictors are to be evaluated. It should be evident from the discussion of the criterion measures above that it was impossible systematically to retest or reobserve, as the case may be, the total group taking the Attitude Study, the Group Behavior Study and the Line Evaluation Form. As far as the Monthly Health Diary is concerned since the men rated themselves for the 12 monthly sessions, it was possible to estimate retest reliability for each item. Accordingly, taking any two successive months for a given item into consideration, the retest reliability was satisfactorily high, in the range of .85 to .90. However, the major assumption underlying the use of the Monthly Health Diary was that symptoms or behavioral indicators of the kind tapped by this instrument would be susceptible to the environmental stresses of the Antarctic and therefore would show changes indicating trends in the adjustment of the men. In the absence of a control group, that is, a matched group not exposed to the Antarctic conditions, it is impossible to ascertain definitely whether the trends observed in the diary data were in fact the result of the environmental conditions.

The factor analytic method which extracts common variance from the intercorrelation of all of the items or tests in the battery was used for the purpose of estimating reliability of the criterion measures. Thus an item on the diary or one of the three tests or rating scores with a high communality suggests high reliability. The communality therefore can be used as an estimate of the reliability of each of the rating scales or tests.²

Ordinarily a factor analysis starts with an intercorrelation matrix comprised of all the tests or measures included for analysis. As will be seen in the results section of this paper (Table III), 33 of the diary items were selected by the authors on the basis that the severity of the symptoms or behavioral indicators being measured by the item might be affected by the Antarctic conditions. Accordingly, for these 33 items the mean was computed for each person over the 12 monthly measurement sessions. These means for each item were then intercorrelated with each man's Line Evaluation, Attitude Study and Group Behavior scores. This 36 X 36 matrix was factor analyzed by the group centroid factor analytic method, (7). Communality estimates for the correlation matrix were obtained from the highest column coefficient.

RESULTS

Derivation of the Criterion Scores. The matrix of 630 correlation coefficients is presented below.

TABLE III—Intercorrelation of the 36 Criterion Measures Obtained from Deepfreeze II

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1 Amour. Sleep, II(a) ^a												
2 Time to Fall Asleep, II(b)	-05 ^b											
3 Number Dreams, II(d)	00	-02										
4 Time to Awaken, II(f)	14	25	08									
5 Irritability on Awakening, II(g)	03	08	14	30								
6 Frequency of Urination, III(a)	-06	19	05	05	-06							
7 Number Bowel Movements, III(b)	-10	09	02	01	-02	10						
8 Tension, IV(f)	-08	04	00	12	07	18	-04					
9 Feel about Volunteering, IV(g)	-06	01	10	09	15	04	07	09				
10 Rate Living Conditions, IV(h)	05	11	-05	22	14	01	-24	07	06			
11 Pay Adequate, IV(i)	08	16	13	16	09	-02	06	-04	06	07		
12 Fatigue, IV(j)	-04	03	10	02	16	06	-14	18	13	11	00	
13 Mood, IV(k)	03	06	-04	06	02	18	04	-06	01	02	-03	06
14 Dizziness, IV(l)	04	-06	31	00	16	09	00	30	06	02	-03	10
15 Unsteadiness of Hands, IV(m)	-07	07	19	18	24	-03	06	23	15	-02	12	21
16 Heart Palpitation, IV(n)	-06	11	30	00	03	04	-05	14	13	01	10	-01
17 Breathing Difficulty, IV(o)	-11	12	10	04	06	03	01	08	10	-05	13	12
18 Efficiency, V(a)	24	-03	04	09	10	-03	-15	09	-11	07	-11	06
19 Interest in Duty, V(b)	-07	12	-07	-00	-03	16	05	16	-03	02	-03	08
20 Feel like Quitting, V(c)	-03	03	-02	-02	06	-03	06	07	16	-03	01	16
21 Difficulty in Concentrating, V(d)	-04	07	-04	-04	10	-01	-11	16	08	06	11	13
22 Irritability toward others, VI(a)	22	-04	21	-07	04	-10	-09	13	-03	08	-02	10
23 Felt like Joking, etc., VI(b)	12	-10	01	14	11	-04	-17	07	-04	07	00	07
24 Others friendly, II(c)	-03	-08	-62	26	21	-11	-25	14	08	14	10	10
25 Number Cigarettes, VII(a)	-02	04	-14	04	-08	06	03	-02	-05	14	-10	05
26 Pipefuls of Tobacco, VII(c)	-02	06	-11	02	-01	18	-02	-02	04	16	-06	-10
27 Homesickness, VIII(a)	03	18	14	17	12	-07	-06	03	-05	11	-01	07
28 Enjoy Movies, VIII(e)	08	-05	03	02	14	-11	-01	-03	01	-03	-02	06
29 Enjoy Recreation, VIII(d)	14	08	01	14	13	-12	11	-12	03	01	06	01
30 Enjoy Cards, etc., VIII(e)	12	08	-08	13	07	02	12	-09	02	55	-02	-04
31 Dreams Pleasant, II(e)	-12	01	13	10	01	22	-17	00	66	10	-04	16
32 Severity of Headaches, IV(b)	07	14	36	-28	-11	00	08	31	02	03	14	-03
33 Smoking Increased, VII(d)	-04	-13	-01	04	-07	02	06	00	-01	-21	-07	06
34 Line Evaluation	-09	-01	-11	20	-10	-09	04	-21	02	-09	18	-14
35 Attitude Survey	05	13	-19	05	00	13	-02	-06	-02	01	05	00
36 Group Behavior	06	06	-06	-11	05	21	-02	-02	04	09	-01	-01

Footnotes are on the last page of the table.

^aAdjusted the communality differs from the reliability of a test or measurement instrument only by the amount of variance due to a specific factor. The reader is referred to an standard text pertaining to the techniques of factor analysis (e.g., 11, 12).

TABLE III (continued)

Variables	13	14	15	16	17	18	19	20	21	22	23	24
14 Dizziness, IV(l)	-12											
15 Unsteadiness of Hands, IV(m)	-03	30										
16 Heart Palpitation, IV(n)	-13	36	32									
17 Breathing Difficulty, IV(o)	-11	20	11	35								
18 Efficiency, V(a)	04	15	-07	00	-04							
19 Interest in Duty, V(b)	03	09	08	15	15	13						
20 Feel like Quitting, V(c)	-04	02	15	02	07	-09	-06					
21 Difficulty in Concentrating, V(d)	-01	08	02	00	06	-23	-04	05				
22 Irritability toward Others, VI(a)	-05	09	-03	-06	11	42	13	08	14			
23 Felt like Joking, etc., VI(b)	12	-10	-08	-24	-11	20	-02	-05	-06	12		
24 Others Friendly, V()	07	-02	10	-18	-03	06	-04	03	18	03	36	
25 Number cigarettes, VII(a)	02	-38	02	10	04	00	05	-03	00	-01	-10	-11
26 Pipefuls of Tobacco, VII(c)	00	-14	-10	-10	-05	-07	-13	05	-06	-12	-03	08
27 Homesickness, VIII(a)	-01	09	13	10	06	10	24	-12	-04	01	-06	-09
28 Enjoy movies, VIII(c)	-06	12	-03	02	08	06	07	-01	08	13	-02	02
29 Enjoy recreation, VIII(d)	02	05	01	-05	-09	04	-02	00	-07	01	-06	-03
30 Enjoy cards, etc. VIII(e)	01	04	-03	-02	-04	00	00	02	-12	-04	-10	-10
31 Dreams Pleasant, II(e)	16	-21	-05	-23	-07	-10	-02	11	13	03	13	36
32 Severity of Headaches, IV(b)	-06	00	10	14	14	21	-14	16	20	08	15	03
33 Smoking Increased, VII(d)	08	-17	-07	-12	-09	-06	12	-03	-03	15	06	-01
34 Line Evaluation	04	-17	-12	-17	-17	00	-10	09	-13	-21	08	00
35 Attitude Survey	12	-37	-04	-28	-09	-02	-06	-01	02	11	13	13
36 Group Behavior	01	-18	-14	-23	-20	-04	-13	02	04	-04	13	10

TABLE III (continued)

Variables	25	26	27	28	29	30	31	32	33	34	35	36
26 Pipefuls of Tobacco, VII(c)												
27 Homesickness, VIII(a)	05	-02										
28 Enjoy movies, VIII(c)	-17	-22	03									
29 Enjoy recreation, VIII(d)	-08	-04	02	25								
30 Enjoy cards, etc., VIII(e)	18	01	14	12	22							
31 Dreams Pleasant, II(e)	10	-02	18	-07	-23	-06						
32 Severity of Headaches, IV(b)	-04	18	10	-23	-24	-30	-03					
33 Smoking Increased, VII(d)	17	18	-20	06	00	-02	06	-10				
34 Line Evaluation	-06	-02	-24	-06	13	-02	03	-04	-18			
35 Attitude Survey	02	03	-11	-05	08	-05	13	06	-04	27		
36 Group Behavior	-12	20	-08	-02	05	-02	25	-01	01	32	16	

* II(a), II(b), etc. indicate the item number in the Diary. Variables 1 through 33 are means of 10 successive monthly ratings on each Diary item

* The correlation statistics are Pearson coefficients. Decimals are omitted. N varies from 77 to 106 for the Diary items. For variables 34-36, N was 48, 71, and 34 in that order. With an N of 34, 77, and 106, a coefficient of .32, .22, and .19 respectively are significant at the 5% confidence level.

It is immediately apparent that the 630 correlation coefficients tend to be quite low. The mean and standard deviation of the correlation coefficients contained in Table III are .09 and .07 respectively, with a range from .00 to .36. Using the 5 percent confidence criterion, 31 of the coefficients in Table III would be significant by chance; forty-nine are in fact significant at that confidence level. These reduced correlational statistics suggest that either the reliabilities of the criterion measures are extremely low, or, and this is perhaps less likely, most of the individual measures tend to "tap areas of adjustment" which are unique or at least relatively unrelated to each other. Actually, as will be seen in Table IV immediately following, both explanations have some basis in fact.

It would be well to recall the methodological discussion contained in the procedure section above. There, the question of reliability as related to the communalities estimated from the factor analysis was discussed. The h^2 entries in column 7 of Table IV are the communalities for each of the 36 variables. It is seen that the highest communality is for the Attitude Survey, variable No. 35. Too, the h^2 for the Group Behavior Score appears to be usefully high. As for the Diary Data, variable no. 9, how the person felt about volunteering for the duty, and variable No. 30, whether the person enjoyed playing cards and other recreational activity, received communality estimates in the high 70's and 80's. In addition, 9 other variables from the Monthly Health Diary received communality estimates in the high 50's and 60's, namely variables 20, 13, 29, 16, 23, 19, 36, 15, and 24. Although these communalities are not as high as is ordinarily desirable, they do suggest that about 1/3rd of the diary variables are measuring certain adjustment

processes related to the Antarctic conditions with a useful degree of reliability.

In order to identify the content of each of the five adjustment factors, it was necessary to consider individually the nature of the items and/or tests which significantly load, or fail to load, each of the factors.

TABLE IV—ORTHOGONALLY ROTATED CENTROID FACTOR MATRIX OBTAINED FROM THE 36 CRITERION VARIABLES

Variables	AdF ₁	AdF ₂	AdF ₃	AdF ₄	AdF ₅	h^2
1 Amount Sleep	-12	-03	-17	02	08	05
2 Time to Fall Asleep	06	-06	06	-12	28	10
3 Number Dreams	-14	-08	35	21	13	21
4 Time to Awaken	06	-33	00	-22	52	43
5 Irritability on Awakening	35	-26	26	-14	43	52
6 Frequency of Urination	11	07	-05	06	04	02
7 Number Bowel Movements	12	18	04	-22	-07	10
8 Tension	10	21	37	37	17	36
9 Feel about Volunteering	<u>84</u>	-03	-22	-04	23	81
10 Rate Living Conditions	<u>49</u>	05	-25	26	33	48
11 Pay Adequate	<u>51</u>	-10	-19	-01	27	38
12 Fatigue	21	-16	19	13	24	18
13 Mood	<u>59</u>	24	<u>46</u>	17	08	64
14 Dizziness	-01	-01	<u>65</u>	11	12	45
15 Unsteadiness of Hands	30	10	<u>55</u>	22	34	53
16 Heart Palpitation	03	22	<u>72</u>	19	06	61
17 Breathing Difficultly	16	16	<u>48</u>	24	09	35
18 Efficiency	-27	01	-09	<u>41</u>	04	25
19 Interest in Duty	<u>74</u>	04	-06	07	-03	56
20 Feel like Quitting	<u>76</u>	-10	-28	03	15	69
21 Difficulty in Concentrating	06	-22	06	20	16	12
22 Irritability toward others	08	<u>34</u>	13	04	-04	14
23 Felt like Joking, etc.	-16	24	<u>42</u>	<u>58</u>	13	61
24 Others friendly	-36	09	-12	<u>53</u>	<u>39</u>	59
25 Number Cigarettes	36	29	21	09	-10	28
26 Pipefuls of Tobacco	-02	03	-14	14	-05	04
27 Homesickness	16	-02	27	-03	20	14
28 Enjoy Movies	04	<u>37</u>	12	-08	13	18
29 Enjoy Recreation	-14	<u>74</u>	-18	-04	27	67
30 Enjoy Cards, etc.	-02	<u>83</u>	08	03	16	72
31 Dreams Pleasant	-12	08	<u>39</u>	<u>40</u>	12	35
32 Severity of Headaches	13	02	32	<u>59</u>	-16	49
33 Smoking Increased	21	15	-07	16	19	13
34 Line Evaluation	40	07	32	-16	19	33
35 Attitude Survey	<u>91</u>	-08	09	01	13	86
36 Group Behavior	<u>70</u>	-14	-14	-05	10	54

*AdF₁, AdF₂, AdF₃ refers to Adjustment Factors 1, 2, 3. h^2 refers to the communalities of the 36 variables. Decimals are omitted.

The Structure of the Adjustment Factors

Somewhat arbitrarily the three to eight highest-loading tests or items on each factor were examined as to content. The content of these tests or items for each factor is indicated in Table V following.

TABLE V
DESCRIPTION OF THE FIVE ADJUSTMENT FACTORS

Matrix Identification Number	Item Number in Diary	Factor Loadings	Description of the Adjustment Factor ^a
Adjustment Factor I (AdF ₁)			
35	—b	.91	Strong positive attitudes toward the project as a whole.
8	IVg	-.84	Very pleased with having volunteered for this duty.
20	Vc	-.76	Feel very much like staying on Deepfreeze.
19	Vb	-.74	Feel very interested in the duties.
36	—c	.70	Strong indicators of optimal morale and favorable attitudes toward the group as a whole.
13	IVk	-.59	Moods tend to be consistently happy".
11	IVi	-.51	Feel Deepfreeze pay is "good to excellent".
10	IVb	-.49	Rate living conditions as "good to excellent".

TABLE V (continued)
DESCRIPTION OF THE FIVE ADJUSTMENT FACTORS

Matrix Identification Number	Item Number in Diary	Factor Loadings	Description of the Adjustment Factor ^a
Adjustment Factor II (AdF ₂)			
29	VIIIId	.74	Did not enjoy or did not use recreational facilities.
30	VIIIe	.83	Did not enjoy or did not play cards, games, etc.
28	VIIIc	.37	Did not enjoy or did not go to movies.
22	VIa	-.34	Tend to be more irritable to shipmates.
4	IIIf	-.33	Tendency to take a long time to wake up after sleeping.

TABLE V (continued)
DESCRIPTION OF THE FIVE ADJUSTMENT FACTORS

Matrix Identification Number	Item Number in Diary	Factor Loadings	Description of the Adjustment Factor ^a
Adjustment Factor III (AdF ₃)			
16	IVn	.72	Seldom notice heart beating loudly.
14	IVl	.65	Seldom notice dizziness or blurring of eyes.
15	IVm	.52	Very slight or no unsteadiness of hands.
17	IVo	.48	No difficulty in breathing.
13	IVk	-.46	Moods tend to be consistently happy.
23	Vb	-.42	Felt very much like chatting and joking with shipmates.
31	IIc	-.39	If dreamed at all, dreams tended to be pleasant.

TABLE V (continued)
DESCRIPTION OF THE FIVE ADJUSTMENT FACTORS

Identification Number Matrix	Number in Diary Item	Factor Loadings	Description of the Adjustment Factor*
Adjustment Factor IV (AdF ₄)			
32	IVb	.59	Slight tendency toward heada- *
23	Vb	.58	Felt very little like chatting and joking with shipmates.
24	VIc	.53	Shipmates tend to be much less friendly.
18	Va	.41	Tend toward being less efficient than usual.
31	IIc	.40	If dreamed at all, dreams tended to be unpleasant.
8	IVf	.37	Tended to be more relaxed than usual.

TABLE V (continued)
DESCRIPTION OF THE FIVE ADJUSTMENT FACTORS

Identification Number Matrix	Number in Diary Item	Factor Loadings	Description of the Adjustment Factor*
Adjustment Factor V (AdF ₅)			
4	11f	.52	Tend toward requiring less time to feel awake.
5	11g	.49	Tend toward feeling little or not at all irritable.
24	VIc	.39	Shipmates tend to be friendly.

* Statement takes into account the sign of the factor loading.

* Keyed score from the "Attitude Study" questionnaire (see Appendix B, C & D for examples of the questionnaire items).

* Keyed score from the "Group Behavior Study".

From an examination of the content of the highest-loading tests or Diary items contained in the above table, it appears that Adjustment Factor I (Ad F₁) might be labeled OVERALL FAVORABLE ADJUSTMENT to the Antarctic condition. At first glance the factor appears to be bi-polar. This resulted from the fact that favorable Diary responses e.g., happy moods, favorable attitudes towards Deepfreeze and so on, were equated to the smallest numbered code used in the analysis. It is noted that the highest loading test is the score on the Attitude Study (see Appendix B for an example of this questionnaire). Assuming that this score indicates relatively strong positive attitudes toward the project as a whole, it seems probable that high scores

in this factor indicate adequate adjustment to the Antarctic environment. In addition, Diary items apparently "tapping" similar attitudes load this factor and, in a sense, give more substance to its content. Thus men with high average diary ratings on items pertaining to satisfaction with having volunteered for the mission, to feeling like "staying on" Deepfreeze, and to maintenance of interest in the duties associated with the project received high scores on this factor. Moreover, high scores on AdF₁ resulted from reported ability to sustain "happy" moods, from rating the living conditions as "good to excellent", and from indicating that the Deepfreeze pay was "good to excellent". Finally, those men receiving high scores on this factor obtained high scores

on the Group Behavior Questionnaire (See Appendix C for a list of the questionnaire items). In short, as indicated by the magnitude of the loadings and the content of the variables with these loadings it appears that persons obtaining high factor scores in this particular factor would be likely to have greater adjustment potential insofar as the Antarctic conditions are concerned than would those men obtaining low scores on this factor.

Adjustment Factor II (Ad F₂) on the other hand suggests a criterion of inadequate adjustment to the existing conditions. Thus a person obtaining a high score on Ad F₂ tended to report less enjoyment of recreational facilities, less participation in cards and games and tended to be more irritable with respect to his shipmates. Also, persons obtaining high Ad F₂ scores tended to have some difficulty in awakening from sleep. Although only suggestive, it appears that high scores in this factor may indicate a tendency for social withdrawal and/or depression. Although admittedly somewhat presumptuous, the tendency to withdraw from a social situation in which solitary isolation is virtually impossible would seem to be indicative of inadequate, or perhaps inappropriate adjustment. It would appear therefore that AdF₂ may be part of some complex syndrome of depression. For descriptive purposes this factor may be tentatively labeled a Tendency Toward Withdrawal.

Those persons receiving high scores in Adjustment Factor III (AdF₃) may be characterized as being free from what might be called psychosomatic symptoms. Accordingly, absence of dizziness, of blurred vision, of unsteadiness of hands, of difficulty in breathing, and of palpitating heart characterized those persons receiving high scores on AdF₃. It should be noted in passing that only one of the items loading Ad F₃ also loaded Ad F₁. This overlapping diary item pertaining to the characteristic moods reported by the men (Item 13) loaded both Ad F₁ and Ad F₃ in the same direction

indicating the presence of, or the tendency toward, consistently happy moods (absence of depression) as being a characteristic of both Adjustment Factors. High scorers in Ad F₁ would seem also to be characterized as optimally socially adjusted in that pleasurable interpersonal relations are consistently reported month-to-month. Although receiving only a slight weighting in this particular factor it appears that variable number 31, the "presence of pleasurable dreams", may also be suggestive of the favorable emotional condition of the men with high scores on this factor⁷.

In short it appears that high scorers in both Ad F₃ and Ad F₁ may be considered optimally adjusted to the Antarctic conditions. The difference between Ad F₁ and Ad F₃ seems to be that the former is more attitudinal in nature and the latter more reflective of the men's perception of their own physiological changes. For purposes of communication, Ad F₃ might be labeled ABSENCE OF PSYCHOSOMATIC COMPLAINTS. Irrespective of the labels attached to the Adjustment Factors, the important point is that from the nature of the subjective responses loading Ad F₁ and Ad F₃, it appears that persons receiving high scores on these factors could be assumed to be more adequately adjusted to the existing conditions than were those with low scores on the same criteria.

Adjustment factor IV (Ad F₄) can be contrasted with Ad F₁ in at least two respects. In the first place those persons receiving high scores in Ad F₄ reported that they felt less like chatting and joking with their shipmates whereas those receiving high scores in Ad F₁ reported having felt more like chatting and joking with shipmates. Secondly, high scorers in Ad F₄ reported that if they dreamed at all, their dreams tended to be unpleasant whereas those receiving high scores in Ad F₁ reported their dreams to be pleasant. Other characteristics of this factor as indicated in Table V are that persons receiving high scores reported a slight tendency toward

⁷ It is realized that using the reported affective tone of dreams as an indicator of adjustment is highly questionable on a theoretical basis. It is not known that persons whose dreams are reported to be pleasant are better adjusted than those whose dreams are reported to be unpleasant. In the absence of specific information concerning dream content, it is difficult, if not impossible, to determine which persons were actually dreaming at all, much less the affective quality of the dreams.

headaches and to have been less efficient than usual. Both of these characteristics would seem to suggest less adequate adjustment. Moreover, variable number 24 (perceived friendliness of others) loads this factor. This finding suggests that high scorers perceive others as reacting less friendly toward them. Finally, high scorers report a tendency to be more relaxed than usual as time progresses although the loading in this particular variable (variable number 8) is relatively low. It would appear that the slight tendency toward headaches, the reluctance to interact in groups, the perceived unfriendliness of others, and a self-perceived drop in efficiency, taken together, argue that this particular factor is quite likely a negative adjustment criterion. Therefore, persons receiving high scores in this particular factor were assumed to be less adequately adjusted than those who receive low scores.

Adjustment Factor V (Ad F₅), loaded by only three variables, appears to be rather vaguely structured in the final rotated solution limiting what can be said about its definition. Although only marginally acceptable as an adjustment criterion, it appears that factor scores obtained from Ad F₅ indicate favorable adjustment since the identifying variables contraindicate withdrawal and/or depression.

Validity of the Predictors. Before proceeding to an examination of the validity of the predictors employed in this study, it may be well to point out a rather serious theoretical limitation to the use of criteria derived from factor scores computed as they were in this study. In the first place it may be recalled that 33 of the 36 variables included in the correlation matrix to be factor analyzed (see Table III) were statistics obtained from the Diary. The particular statistic obtained for each man for each of the 33 Diary items was computed from the ten monthly ratings. These means for each of the diary items were then correlated with the scores from the Line Evaluation Rating, the Group Behavior Test, and from the Attitude Test (Variables 34, 35 and 36) after which the resulting matrix factor was analyzed. The limitation comes from the fact

that these means for each of the Diary items quite likely have a sizeable standard error and consequently would affect the reliability of the correlation coefficients. The coefficients of questionable reliability would in turn quite likely reduce the stability of the factor loadings. As a result, the factor structures depicted in Table V above may be quite unreliable and therefore any factor scores computed from these structures would be immediately suspect from the standpoint of reliability. The justification for utilizing these criteria, however, stems from the fact that validity statistics are always attenuated by measurement error (unreliability) and therefore validity coefficients computed for the predictor battery would, if anything, underestimate the usefulness of the tests in the assessment battery.

The second limitation to this method of criterion derivation involves the decision to adjudge the high scorers in a particular factor as being more adequately adjusted than the low scorers or vice versa depending on the content or the items loading each factor. This decision of course was based largely on intuition. For example, Ad F₁ was labeled "Favorable Attitudes Toward the Deepfreeze Project". Hence, persons obtaining high scores in this factor do so by reason of their admitted favorable attitudes toward the work conditions and the pay for Deepfreeze, interest in their duties, satisfaction with having volunteered for the duty and so on. It seems reasonable on an *a priori* basis that persons indicating these attitudes would show more adequate adjustment than those indicating less strong attitudes in the same direction or certainly more adequate adjustment than those indicating attitudes in the opposite direction. The same reasoning can be applied to the interpretations of the remaining factors. These points will be raised again in the context of the discussion at the end of this paper.

The first problem was to ascertain the validity of the more standardized tests contained in the predictor battery. To do this, scores were obtained for each man for each criterion factor by summing his score or

rating (in z-score form) on all of the variables identifying the factor, all z-scores being weighted by their corresponding loading on the factor. These factor scores were then correlated with the predictor scores obtained from the five tests administered at Davisville prior to the departure for the Antarctic. Table VI contains a summary of these correlation coefficients.

TABLE VI—Correlation of Objective Test Data With Adjustment Factors

Predictors	Adjustment Factors						Mean	S.D.	N
	AdF ₁	AdF ₂	AdF ₃	AdF ₄	AdF ₅				
Shipley-Hartford Verbal	.42	.09	.14	-.16	-.02	29.53	4.55	76	
Shipley-Hartford Abstraction	.31	.00	-.08	-.20	-.03	28.10	7.99	76	
Shipley-Hartford Conceptual Quotient	.08	-.03	-.17	-.05	-.01	96.40	14.48	76	
Sports Inventory	.16	-.25	-.14	.46	-.08	18.89	4.80	74	
Neurotic Symptom Checklist ^a	-.13	.05	.32 ^b	.01	.01	6.41	0.39	79	

^a The statistic used for this measure was the Coefficient of Contingency. The Pearson r was used for the other measures.

^b Significant of the confidence level. A Pearson r of 0.22 and .30 are significant of the 5% and 1% level respectively.

At first glance it is noted that the coefficients obtained with Ad F₃ are all negligible. This finding suggests the probable unreliability of this factor. Apparently both the Verbal and Abstraction scores obtained from the Shipley-Hartford scale have significant relationship to Adjustment Factor I. On the other hand, the Conceptual Quotient obtained from the ratio of these two scores shows no significant relationship with any of the adjustment factors. Assuming Ad F₁ is positively related to optimal adjustment to the Antarctic conditions, it may be said that persons who obtain high scores in either one or both of the Shipley-Hartford Scales have a greater probability of adjusting favorably to the Antarctic conditions than do those obtaining low scores on these particular tests.

It can be inferred from these findings that those men who made the most favorable adjustment, were of a higher level of intelligence (i.e. intelligence is measured by the Shipley-Hartford Scale). This does not imply that intelligence per se is responsible for the ability to adjust adequately, but as far as these data are concerned, the odds for the more intelligent person to

adjust more adequately to Antarctic duty are greater than for those of lesser intelligence.

It is interesting to note that the empirically derived score obtained from the Sports Inventory resulted in two significant correlations with the adjustment factors. Assuming that both Ad F₂ and Ad F₄ scores are each negatively related to overall adjustment to these conditions, it appears that the validity coefficients are contradictory. Hence the minus .25 correlation with Ad F₂ indicates high scorers in the Sports Inventory tend to show fewer of the "maladjustive" indicators defining Ad F₂ (See Table V). On the other hand the .46 correlation of the inventory with Ad F₄ suggests persons obtaining high scores in the Sports Inventory tend to show less adequate adjustment to the existing conditions. In the absence of independent criteria of adjustment to these conditions it is impossible to determine whether a high score on the Sports Inventory is a predictor of more or less adequate adjustment. The best guess would be based on the larger validity coefficient, namely the .46 correlation of the Inventory with Ad F₄. Assuming as we have done in the previous discussion of these factors that Ad F₄ is negatively correlated with adequacy of adjustment, one might hazard the guess that more of those men obtaining high Sports Inventory scores would show less adequate adjustment to the Antarctic conditions than would those with low Sports Inventory scores. One should note in this context however the very small standard deviation of the Sports Inventory scores as compared to its mean. This suggests that individual differences in the scores on the Sports Inventory are indeed small, and, as a consequence, it is unlikely that this score could be effectively used as a predictor of Antarctic adjustment.

As for the validity of the Neurotic Symptom Chest List, row 5 in Table VI, it is noted that only one significant correlation was found, namely, the correlation with Ad F₁ (See Appendix G for a sample of the questionnaire). Since Ad F₁ was described as being positively correlated with favor-

able adjustment to the environmental conditions, it is assumed that persons reporting the greater number of the neurotic symptoms contained in the Questionnaire are more favorably predisposed to adjust optimally to the existing conditions. Again, in the absence of external criteria of the validity of both the predictor score and the adjustment criterion (Ad F₃), all that can be said is that there may be a particular pattern of neurotic traits which when found in a candidate for the Antarctic duty may predispose him to more adequate adjustment than if these traits are not there. It should be emphasized that the neurotic traits and the symptoms described in the questionnaire, are not in themselves considered as favorable for adjustment to the Antarctic, but are only grossly symptomatic of general neurotic behavior and conflict. It may be that the isolation afforded by the Antarctic environment results in an encapsulation of the individual to such a degree that he feels less anxious and less in conflict than he does in a normal environment with its routine demands and frustrations. Furthermore, the majority of the symptoms listed are primarily descriptive of tension and do not contain the more maladjustive neurotic mechanisms of defense.

One should mention at this point that the validity coefficient obtained (.32) may be greatly attenuated as a result of the extremely reduced variability of the scores on the Neurotic Symptom Check List. In this context, it is noted that 77 percent of the 79 men responding to the Neurotic Symptom Check List, obtained a score of "0", thus indicating the severity of the positive skew in the predictor distribution. Following from this particular finding, subsequent Deepfreeze assessment programs have included a neurotic questionnaire, the Personnel Inventory Barometer (PIB) (8) which employs a multi-category response

format intended to reduce the severity of the skew and allow for more individual differences in the neuroticism scores obtained. It is hoped that scores obtained by the use of this particular questionnaire will show enhanced validity with respect to the criterion data presently being collected in the Antarctic.

The next problem was to investigate the predictive validity of the ratings made from the interview and projective test data also obtained at Davisville, Rhode Island. At this point it may be well to recall the discussion of the methods employed to obtain the combined psychiatrists' and psychologists' ratings. Very briefly, a psychiatrist submitted each man to a semi-structured personal interview from which data pertaining to background factors, to areas of conflict, and to patterns of attitudes and behavior were obtained. The Rorschach test was administered to groups of approximately 15-20 subjects by use of an opaque projector using the original test figures. The Rorschach inquiry was administered by a psychologist to each individual subject and then scored, summarized, and interpreted. The psychologist on the basis of the Rorschach test findings rated each subject with respect to eight trait-dimensions (see Appendix E for examples of these rating scales). The psychiatrist performed the same function independently as based on his findings derived from his personal interview with each candidate.

The first problem was to estimate the inter-rater consistency of each of these rating scales.⁸ Since independent ratings with respect to the same trait dimensions were available, one possible way to estimate consistency was from inter-rater agreement. Accordingly, column 2 in Table VII contains the correlation between the ratings by the psychologist with the same ratings by the psychiatrist assigned independently for each of the subjects.

As may be seen from the example of the rating scale in Appendix E, there were actually nine rated dimensions included in the interview and testing procedure. As a result of the consensus of opinion expressed by the psychiatrists and psychologists participating in the assessment program, trait-dimension A Motivation for Present Objective, was eliminated from the predictor battery on the ground of its unreliability.

TABLE VII Interrelation* of Psychiatrists' and Psychologists' Ratings With Each Other and With the Combined Ratings

Trait Being Rated	Psychologist With Psychiatrist	Psychiatrists' Ratings With Combined Ratings	Psychologists' Ratings With Combined Ratings
A. Potential Effectiveness for Operation Deepfreeze.	.37 (N = 71)	.85 (N = 78)	.70 (N = 72)
B. Ability to Function in a Group.	.11 (N = 61)	.82 (N = 67)	.60 (N = 62)
C. Ability to Communicate.	.21 (N = 60)	.47 (N = 56)	.73 (N = 62)
D. Ability to Withstand Stress.	.11 (N = 61)	.67 (N = 76)	.38 (N = 62)
E. Ability to Cope with Depression.	.15 (N = 61)	.65 (N = 67)	.63 (N = 62)
F. Ability to Cope with Aggression.	.18 (N = 61)	.62 (N = 67)	.48 (N = 62)
G. Expression of Overt Hostility.	.47 (N = 58)	.72 (N = 64)	.70 (N = 62)
H. Expression of Overt Anxiety.	.45 (N = 58)	.66 (N = 64)	.41 (N = 62)

* All coefficients are Pearson r's. See text for explanation of the data upon which the ratings were based.

First of all it is noticed that the population sample was greatly reduced as a result of the absence of ratings from either the psychologist or psychiatrist. Nevertheless in the absence of information to the contrary, it was assumed that the fractionation of the data was random and therefore that the sample was representative of the total population. Obviously the correlation coefficients between the assigned ratings for each scale are not remarkably high. In fact, using the five percent confidence criterion (Pearson r greater than .21), only four of the inter-rater coefficients are significant. Table VII also contains the correlation of the combined ratings made on the same rating scales following a discussion of the results by pairs of psychologists and psychiatrists who had interviewed the same men with the ratings of psychiatrists (column 3) and with the ratings of the psychologists (column 4). Although only grossly indicative, these correlation statistics indicate that in five of the eight scales the psychiatrists' ratings contributed more to the combined evaluation than did the ratings of the psychologists. The reverse was true with respect to trait-dimension C, ability to communicate. The correlation coefficients for the remaining two scales were approximately equal. On the basis of the fact that the inter-rater agreement was quite low and that the correlation of both

the psychiatrist and psychologist with the combined evaluation was reasonably high (as would be expected), it was decided to use as predictors the combined ratings made after a discussion of the findings both from the psychiatric interview and the Rorschach test. The correlation of the combined ratings with each of the adjustment factors is presented in Table VIII below.

TABLE VIII—Correlation of Combined Psychiatrists' and Psychologists' Ratings With the Adjustment Factors (N = 75)

Combined Rating Category	Adjustment Factors				
	AdF ₁	AdF ₂	AdF ₃	AdF ₄	AdF ₅
A Potential Effectiveness for Operation Deepfreeze	.38	.16	.21	-.10	-.03
B Ability to Function in a Group	.22	.67	.34	-.10	.00
C Ability to Communicate	.33	.2	.57	-.22	-.27
D Ability to Withstand Stress	.17	.09	.02	-.02	-.18
E Ability to Cope With Depression	.04	.14	.09	-.05	-.05
F Ability to Cope With Aggression	.05	.00	.67	-.17	-.09
G Expression of Overt Hostility	-.51	.97	.18	.17	.03
H Expression of Overt Anxiety	.16	.09	.19	-.07	-.09

* All statistics are Pearson coefficients. A Pearson of 0.22 and .03 are significant at the 5% and 1% confidence level respectively.

Following from our discussion of the factor content (Table V) it may be recalled that Adjustment Factors I and III tended to be positively correlated with favorable adjustment to the existing conditions. The reverse was true with respect to Adjustment Factor II and Adjustment Factor IV.

Accordingly, assuming this directionality in the Adjustment Factors, it may be said that combined ratings with respect to Potential Effectiveness for Operation Deepfreeze, Ability to Function in a Group, Ability to Communicate, and "absence" or "reduced" Overt Expression of Hostility are significantly related to Ad F₁. It may be said therefore that persons receiving high combined ratings with respect to these scales are those persons who tend to receive high factor scores in Ad F₁. Upon examination of the content of the items or tests loading the adjustment Factors (Table V), one sees that those persons receiving high scores on these combined ratings are those who show high interest and considerable satisfaction with the project as a whole, consider the pay and living conditions adequate, and feel pleased with having volunteered for this duty. All in all these rating data appeared to be usefully valid for predicting those individuals with strong initial motivation and whose motivation seemed to be maintained at a favorable level.

Three of the validity coefficients with respect to Ad F₃ are significant in a positive direction. Again assuming that high scores with respect to Ad F₃ indicate optimal adjustment, it may be said that ratings with respect to the Ability to Communicate, the Ability to Function in a Group, the Ability to Cope with Aggression, and, to a lesser degree, ratings with respect to Potential effectiveness for Operation Deepfreeze are all predictive of favorable adjustment to the Antarctic conditions. Of particular note are the highly significant correlations of trait-dimension C, Ability to Communicate (.57), and the trait-dimension F, Ability to Cope with Aggression (.67). Looking at the content of Ad F₃ in Table V, it is seen that the factor structure suggests absence of psychosomatic-like symptoms and a tendency to maintain a rather "depression-free" mood. It appears that those persons who receive high ratings on these four scales are those who report relatively few of the symptoms defining Ad F₃. These data indicate that ratings of the kind obtained during the Davisville assessment

were of considerable use in predicting favorable adjustment to the existing conditions.

There is only one non-chance validity coefficient with respect to Ad F₄. Assuming as we did in the discussion of the content of Ad F₄ that this factor is negatively correlated with optimal adjustment to the Antarctic conditions, it appears that ability to communicate as determined by the combined ratings is one of the most efficient predictors of adjustment to this environment.

Finally it is noted that Ad F₂ has no significant relationship with any of the rating scales and that Ad F₅ has only one non-chance correlation with trait-rating C, Ability to Communicate. As it was impossible, even on an intuitive level to assign directionality to Ad F₅, it is impossible to ascertain the predictive value of the correlation of -.27 with Adjustment Factor V.

All in all, it appears that the most useful trait dimension pertains to the ability of the individual to communicate with those around him and to handle aggressive feelings in a manner which is consistent with the accepted social standards of the group living under these conditions. The absence of detailed information as to the specific observations or cues the psychiatrist and psychologist were basing their ratings upon, presents a difficulty in concluding without reservation that the application of similar assessment procedures in the future would result in the rather optimistic findings presented in Table VIII. If the present study were to be replicated, it is advisable to obtain more specific information regarding the cues used by the interviewers and the test administrators in making their ratings. In this way, the selection procedures can be more accurately evaluated and, if indicated, appropriate modifications of the assessment program can be recommended.

As far as the Rorschach test data are concerned, the research design could include the formulation of Rorschach Test correlates of the behavioral traits assessed. Such correlates would be based on the relationship between various Rorschach test

determinants which every psychologist experienced with the Rorschach Test could follow objectively. It is realized that a similar procedure applied to the data from the psychiatric interview would be more difficult to structure.

Relationship of Background Variables to the Adjustment Factors. The question arises as to possible relationships of certain background variables to the adjustment criteria as determined from the factor scores. One possibility is that the age of the men may have some relationship to adjustment to the Antarctic conditions. Table IX below presents data pertaining to this relationship.

TABLE IX—RELATIONSHIP OF AGE TO THE ADJUSTMENT FACTORS

	Total	Ad ₁		Ad ₂		Ad ₃		Ad ₄		Ad ₅	
		Low ^a	High	Low	High	Low	High	Low	High	Low	High
Less than 25 (Percentage)	43	40	44	46	48	49	46	47	45	44	49
Greater than 25 (Percentage)	47	46	44	41	42	41	44	41	44	43	41
P of χ^2 (df = 1)		n.s.		n.s.		63		n.s.		n.s.	

^a Only 79 men completed the Personal History Form

^b Low and High refer to below and above the Median of the Adjustment Factor Score distribution respectively.

^c Nul probability greater than 10%.

From Table IX is seen that age is correlated significantly only with Adjustment Factor III. It may be recalled (see Table V, p. 15) that Ad F₃ was characterized mainly by an absence of "psychosomatic-like" symptoms. Assuming that high scorers with respect to Ad F₃ show favorable adjustment to the existing conditions, it appears that disproportionately more of the men who were under 25 years of age obtained low factor scores on Ad F₃ than did those who were above 25 years of age. This finding indicates that the older men tended to report less "psychosomatic-like" symptomatology in Antarctic conditions than did the men under 25 years of age.

It seemed possible that persons who were brought up in the colder regions of the United States would show more adequate adjustment to the extreme cold of the Antarctic than those whose homes were in the warmer sections. Table X contains data relevant to this possibility.

TABLE X—RELATIONSHIP OF GEOGRAPHIC LOCATION OF HOME TO THE ADJUSTMENT FACTORS

	Total	Ad ₁		Ad ₂		Ad ₃		Ad ₄		Ad ₅	
		Low ^a	High	Low	High	Low	High	Low	High	Low	High
North (Percentage)	43	44	44	41	48	40	45	42	43	43	43
South (Percentage)	47	42	42	49	45	40	43	43	47	47	47
P of χ^2 (df = 1)		n.s.		65		n.s.		n.s.		n.s.	

^a Complete data were available only on 73 men.

^b Low and High refer to below and above the Median of the Adjustment Factor Score distribution respectively.

^c Nul probability greater than 10%.

From Table X it is seen that significantly more of those men whose homes were in the northern section of the United States received high scores on Ad F₂. It may be recalled that Ad F₂ (see Table V, P. 15) appeared to be correlated negatively with optimal adjustment to the existing conditions. Furthermore it may be recalled that the content of Ad F₂ suggested that high scores were received by those men who showed irritability in their interpersonal relationships as well as lack of interest in group activities of one kind or another. With respect to this criterion therefore, those volunteers from the northern sections of the U. S. probably adjusted less adequately to the Antarctic conditions than would those from the southern part of the country. This finding was, of course, contrary to the hypothesis formulated in this study.

Another hypothesis which would seem to have some basis in fact was that individuals who came from the farm or "wide open spaces" as opposed to those who came from large cities would show more adequate adjustment to the rather barren Antarctic conditions with its absence of urban conveniences. Forty-one percent of the group for which complete data were available (N = 78) reported that they were from the farm or a country village, 22 percent from a small city and 27 percent from a medium or large city. Comparing each of these categories with the high and low scorers in each of the five factors showed no significance whatsoever

Another hypothesis to be examined pertained to the marital status of the group. Based on data from 74 men only, it was found that 33 percent of this group were married and 60 percent single. Only one person in this group was divorced. Table XI presents the comparison of married versus single men with respect to their scores on each of the Adjustment Factors.

TABLE XI—RELATIONSHIP OF MARITAL STATUS TO THE ADJUSTMENT FACTORS

	Total	Ad F ₁		Ad F ₂		Ad F ₃		Ad F ₄		Ad F ₅	
		Low	High	Low	High	Low	High	Low	High	Low	High
Married (Percentage)	39	34	23	41	35	33	65	39	41	31	44
Single (Percentage)	61	46	76	57	65	67	35	65	57	69	56
P of X		.02		n.s.		n.s.		n.s.		n.s.	

* Complete data were available only on 74 men.

^b Low and High refer to below and above the Median of the Adjustment Factor Score distribution respectively.

^c Nil probability greater than 10%.

The data in Table XI indicate that significantly fewer of the married men obtained high scores on Ad F₁ as compared to the single men. Recalling that Ad F₁ was assumed to be correlated positively with optimal adjustment to the Antarctic conditions, it appears that single volunteers had a greater probability of showing favorable attitudes towards the duty assignment than married volunteers. This finding in itself is difficult to interpret because of the absence of reliable data pertaining to the length of time the men had been married, the ease with which they could communicate with their wives and family during the wintering-over period, and similar information.

One final relationship remains to be examined, namely the relationship of educational level to the scores received on each of the adjustment factors. Splitting the group into those with a college degree or with some college training and those with high school education or less, it was found that 33 percent of the group of 79 persons for whom accurate information was available had had some college training. These data are presented in Table XII following. Recalling that Ad F₁ and Ad F₂ were found to be correlated in a positive direction with optimal adjustment, it appears that the

college population shows less adequate adjustment as indicated by Ad F₁, but more adequate adjustment as indicated by Ad F₂. In the absence of any independent criteria of adjustment, it does not appear simple to resolve this inconsistency. However, looking at the content of Ad F₁ and Ad F₂ (see

TABLE XII—RELATIONSHIP OF EDUCATIONAL LEVEL TO THE ADJUSTMENT FACTORS

	Total	Ad F ₁		Ad F ₂		Ad F ₃		Ad F ₄		Ad F ₅	
		Low	High	Low	High	Low	High	Low	High	Low	High
College (Percentage)	33	46	16	20	45	22	43	36	56	39	57
High School and Less (Percentage)	67	52	82	80	55	78	57	64	70	61	73
P of X (df = 1)		.01		.05		.05		n.s.		n.s.	

* Only 79 men completed the Personal History Form.

^b Low and High refer to below and above the Median of the Adjustment Factor Score distribution respectively.

Nil probability greater than 10%.

Table V, P. 15), it may be recalled that the content of Ad F₁ was largely attitudinal in nature while that for Ad F₂ pertained to an absence of admitted psychosomatic-like symptoms. One might hazard a guess that the more important variables may have to do with the attitudinal makeup of the person rather than with whether he reported any unusual symptomatology. Therefore, again speculating for the moment, it appears that the college personnel in this sample were more negatively oriented in terms of attitudes toward the operation than were those with high school or less education, even though they tended to admit less frequent occurrences of symptoms such as dizziness and unsteadiness of hands. Adding additional substance to the finding that college trained persons showed less adequate adjustment is the positive relationship with respect to Ad F₂, which was found to be negatively correlated with favorable adjustment to the Antarctic conditions.

Trends in the Diary Data. The question arises as to what changes (if any) occurred in the symptomatology and daily habits reported by the men from the time of their departure for the Antarctic in September of 1956 to their return to the United States in November of the following year. No significant differences between civilian and military item profiles were found, and, as a

result the total available sample was included in the trend analysis to follow. Only those items which could be more or less meaningfully scaled were included in this analysis.

In order to examine the significance of the trends in the response patterns of relevant items in the Monthly Diary, it was decided to examine the data for trends between three periods of time corresponding to the three seasons making up the 12-month "wintering over" assignment. Accordingly, the ratings in February were compared with those made in October, the summer as compared to early spring in the Southern Hemisphere. Also, it seemed advisable to compare ratings in mid-summer (February) with those obtained in late fall or early winter (the month of May). Finally, the third comparison period included the length of time coincident with mid-winter, that is, May until October. Using the Sign Test, a non-parametric method which may be appropriately used to examine the significance of changes in ratings (4), it was possible to estimate the probability that the observed differences between the extremes of the time spans included (e.g. February and May) could be accounted for by chance.

Table XIII contains these data for selected items from the Monthly Health Diary. A minus (-) sign indicates a downward or decreasing trend in the response level of a particular item and a plus (+) sign indicates an upward or increasing trend occurring over the time intervals in question.

An examination of each behavioral item with respect to each of the three selected time spans (Table XIII) indicates the following: Apparently there is a decrease in appetite during the Antarctic winter. Of particular note is the fact that the amount of sleep the person reported he was able to get remained the same or perhaps increased in comparing the summer data with that obtained during the winter. Also of note, is the fact that more dreaming was reported in the winter as compared to the summer months and that these dreams were more

pleasant. It is interesting to note in item IVh, ratings as to being satisfied with the living conditions, that the men in the early months of the expedition (summer time) reported an increasing tendency to report satisfaction with the living conditions. This trend, however, was reversed during the winter months (May-October). As for characteristic moods, diary item IVk suggests a trend towards being less happy when comparing the beginning of the study with the end, the February with the October ratings. Looking for motivational indicators, one sees that item Vc suggests that the motivation to quit the project increased with time but that this trend did not appear until the end of summer and the beginning of winter, approximately six months after having arrived at the Antarctic site. As to interpersonal relationships, the data from item VIb suggests that the 106 men in this sample became less interested in interacting with others by "chatting" and "joking" as time progressed. As a whole, the group reported increasing trends in some of their enjoyment of the recreational facilities at the station. Finally, it is noted in comparing the February ratings with the ratings for May that the group of 106 men reported others responding more friendly to them during this period but with no significant changes subsequently.

One recognizes that the attempt to ascertain changes in the symptomatology or the presence or absence of certain behavioral indicators, should involve properly collected control data. The design used in this study assumed that the Diary data collected from each man prior to, or in the early days of, the Antarctic deployment could be used as control data against which the Monthly Diary data obtained "on station" could be compared. This design imposes serious limitations to the conclusions which can be drawn from the data. Obviously one cannot rule out the possibility that a similar group of persons residing in an environment other than the Antarctic may show the same or similar trends in the monthly ratings. This limitation and others will be discussed in the section to follow.

TABLE XIII—SIGNIFICANCE OF TRENDS IN SELECTED DIARY ITEMS FOR THREE PERIODS OF TIME AT LITTLE AMERICA (N = 106)

Item No.	Item Content	Feb-May _a	Feb-Oct	May-Oct
		Direction P	Direction P	Direction P
Ib	Increase in Appetite	— .01	— .08	n.s.
Ic	Increase in need for liquids to wash down food	— .001	— .001	n.s.
Id	Increase in number of vitamins taken	+ .001	+ .001	n.s.
If	Increase in amount of candy and soft drinks eaten or drunk	n.s.	n.s.	— .02
Ig	Increase in gum chewing	— .06	— .001	n.s.
Ila	Amount of sleep	n.s.	+ .04	n.s.
Iib	Length of time to fall asleep	— .03	n.s.	n.s.
IId	Number of dreams	— .002	+ .09	+ .001
Ile	How pleasant were dreams?	n.s.	n.s.	+ .02
IIf	Length of time to feel awake	n.s.	n.s.	n.s.
Iig	Upon awaking, how irritable have you felt?	n.s.	n.s.	n.s.
IVa	If you had a headache, how long did it last as a rule?	n.s.	n.s.	n.s.
IVb	Severity of headaches	n.s.	n.s.	n.s.
IVe	Unpleasant feelings in stomach	n.s.	n.s.	n.s.
IVf	How tense have you been?	n.s.	n.s.	n.s.
IVg	How pleased do you feel about having volunteered?	n.s.	— .08	n.s.
IVh	How favorable do you rate your living conditions?	+ .001	n.s.	— .001
IVj	How tired have you been?	n.s.	n.s.	n.s.
IVk	How happy have you tended to be?	n.s.	— .09	n.s.
IVi	Any dizziness or blurring of eyes?	n.s.	n.s.	n.s.
IVm	Unsteadiness of hands	n.s.	n.s.	n.s.
IVo	Breathing difficulty	n.s.	n.s.	n.s.
Va	How efficient have you been?	n.s.	n.s.	n.s.
Vb	How interested have you been in your duty?	n.s.	n.s.	n.s.
Vc	Feel like quitting Deepfreeze?	n.s.	+ .02	+ .03
Vd	Difficult to concentrate?	n.s.	+ .05	n.s.
VIa	How irritable have you been?	n.s.	n.s.	n.s.
Vib	Felt like chatting and joking?	n.s.	— .01	— .07
Vic	Friendliness of others toward you	— .04	n.s.	n.s.
VIIa	Number of cigarettes smoked	n.s.	n.s.	n.s.
V.Ib	Number of cigars smoked	n.s.	n.s.	+ .04
VIIId	Has your smoking increased?	n.s.	n.s.	n.s.
VIIIa	Homesickness	n.s.	n.s.	n.s.
VIIIc	Enjoyment of movies	n.s.	+ .001	n.s.
VIIIId	Enjoyment of recreational facilities	+ .01	+ .01	n.s.
VIIIe	Enjoyment of card playing, games, etc.	n.s.	n.s.	n.s.

* Nil probability (two-tailed) estimated from the non-parametric Sign Test (5, p. 248). n.s. indicates non-significant, for the purpose of this study probability greater than 10%.

SUMMARY AND DISCUSSION

The plan of this study was to examine the predictive relationship of group and individually administered test data as well as observations made from a psychiatric interview with criteria of adjustment to the Antarctic conditions. The sample consisted of 109 men volunteering for duty at Little America during the winter of 1957. All test and observational data were collected at Davisville, Rhode Island, prior to the departure of the wintering-over party.

The criterion data were obtained by means of a factor analysis of a matrix derived from the intercorrelation of 33 items from the Monthly Health Diary. Supervisory ratings, a score from an attitude questionnaire, and a measure of group effectiveness made up the remainder of the 36 variables included in the factor analysis.

An orthogonally-rotated factor matrix resulted in five factors, four of which could be more-or-less clearly identified. Factor scores were computed for each man and were assumed to be usefully valid criteria of individual differences in the quality of adjustment to the Antarctic environment.

The significant (confidence level less than 1 percent) correlations of the predictor measures with these Adjustment Factors provided the following conclusions which may be used as cues for the future selection of men for duty in the Antarctic: (1) Men with high scores on the Shipley-Hartford scale show more adequate adjustment; (2) Those with less interest in organized sports (Sports Inventory Scores) would seem to be better adjustment risks; (3) Psychiatrists' and psychologists' combined ratings with respect to Potential Effectiveness for Deepfreeze, Ability to Communicate, Absence of Expression of Overt Hostility, and Ability to Cope with Aggression were usefully predictive of Antarctic Adjustment; (4) Men less than 25 years of age appear to adjust less adequately to the existing conditions; (5) although highly tentative, those from the northern sections of the country tend to adjust less adequately than those from the South; (6) married men obtain systematically lower adjustment

scores than do single men; and (7) college men obtain scores indicating less adequate adjustment on two factors (Ad F_1 and Ad F_2) but receive higher (more adequately adjusted) scores on Ad F_3 .

Discussion of these results would seem to be indicated. The inconsistency of the relationship of educational level to Antarctic Adjustment (preceding paragraph and Table XII) quite probably stems from the differences in factor content of the three factors (Table V). The more highly educated group apparently showed less favorable attitudes toward the project as a whole, showed less effective social adjustment, and at the same time tended to report fewer psychosomatic-like symptoms.

In short, therefore, scores obtained from the Shipley-Hartford, the Sports Inventory, and the Neurotic Symptom Checklist are significantly correlated with at least one of the Adjustment Factors. Moreover, five of the eight combined ratings by pairs of psychiatrists and psychologists were significantly correlated with one or more of the criterion factors. Finally, age, education, marital status, geographical location of birthplace were also correlated with the criteria.

The question of the validity of the factor scores as adjustment criteria should be faced directly. With the exception of the Line Evaluation, the Attitude Survey, and the Group Behavior data, the adjustment factors were identified by arithmetical means computed from 10 consecutive monthly ratings with respect to 33 dimensions. What effect (if any) did falsification of responses have upon the 10 successive monthly ratings? The answer is not forthcoming from these data. It cannot be gainsaid, however, that self-reported questionnaire data of this kind can be, and undoubtedly are, distorted to a degree. Interview responses are of course subject to the same limitation. It is the authors' opinion that the diary data obtained in this study were not seriously affected by this factor. This, it is felt, resulted from the fact that they were administered by a Dental Officer dur-

ing the course of the routine monthly dental examination. According to this officer, rapport was excellent, and insofar as it was possible for him to judge, the men responded frankly and honestly. Also the fact that the group was given frequent assurance that the diary booklets were treated as "confidential" and were used for research purposes only may have contributed to the excellent cooperation of the men in completing the ratings from month to month.

As mentioned previously in the discussion of the factor scores as criteria, was the very real limitation regarding the direction of the correlation of the factors with other criteria of individual differences in the quality of the adjustment to the Antarctic conditions. Data showing the correlation of the arrays of scores on the adjustment factors with other more definitive and independent criteria of adjustment would be needed to provide even a tentative solution to this problem. However, no independent, definitive data of this kind were available. It was assumed instead that persons who reported strong favorable attitudes toward the project and as a consequence received high scores on Ad F, for example, were more adequately adjusted than were those men receiving low scores in this factor. The same rationale can be invoked to justify the decisions as to the directions of the other factor criteria. Notwithstanding the aforementioned limitations, it seemed reasonable to utilize criterion data of limited value rather than none at all. Had carefully collected peer ratings or repeated supervisory judgments as to individual differences in adjustment been available, a more substantial validation of the predictor data might have been possible.

The above discussion is not meant to imply that self rating data are not a useful source of criterion information. On the contrary, self-observed symptoms of fatigue

and stress, particularly if they are reported repetitively in the environmental conditions, may be one of the better means of evaluating individual differences in susceptibility to environmental stresses of the kind of concern in this study. In conclusion, the results of this investigation would seem to suggest several tests and observational methods which have some predictive validity with respect to the criteria used in this study. The population sample came from one Antarctic station only, Little America. It may be that similar studies based upon men from other stations may yield somewhat different results. Until additional and perhaps more refined studies of the validity of the methods used in the selection of men for Antarctic duty become available, the results of the present study stand as evidence of the relative effectiveness of several approaches to this unique selection problem.

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APPENDIX A

DEEPPFREEZE II
Line Evaluation Report

Name: _____ Rank/Rate _____ Service No. _____

Organization: _____

Billet assignment: _____ Length of time under your supervision: _____

As compared to other men in the organization, his performance of duty is
(circle 1)

Poor Average Good Outstanding Don't know well enough to rate.

Please rate this man on the following items; considering his reactions both to training and social adjustment to the members of his group.

1. In the company or group to which he is assigned.
____ He is often arguing and picking fights.
____ He does not let others push him around, but does not look for trouble.
____ He lets others take advantage of him.
____ He never really seems to be part of the group.
2. With regard to his ability to learn and use what he knows:
____ He is unable to understand or carry out simple orders and instructions.
____ He is slow in learning but eventually gets it.
____ He seems to understand instructions but can't carry them out.
____ He has no difficulty learning or carrying out instructions.
3. He responds to orders and instructions:
____ Poorly and with resentment.
____ Obviously resents orders but responds quite adequately.
____ Accepting without comment.
____ With initiative and in a military manner.
4. During free periods:
____ He stays to himself.
____ He is usually a part of the group.
____ He tries to be a part of the group, but the group won't accept him.
____ He is a leader of group activity.
5. With regard to himself and his clothes (check one):
____ He is objectionably dirty and untidy.
____ He is up to par with his shipmates
____ He is unusually neat and clean.
6. During the time that he has been under your supervision, has he been a disciplinary problem? _____ If yes, please elaborate. _____

7. When he is faced with a task, does he work better:
____ When he works alone on the job.
____ When he works with one or more persons, none of whom is a designated leader.
____ When he is working in a group and is specifically supervised on each step of the job.

8. Please comment on how this man reacts to frustration because of difficulties inherent in the task on which he is working, his ingenuity in improvising in order to complete a job, and his initiative in completing a job once he starts. How does he react when his work is disrupted and he has to change jobs or duties suddenly and without notice (does he become disorganized and upset or can he change without being particularly disturbed)?

9. What is your general evaluation of this man as pertains to his vocational and social suitability for the duty in the Antarctic?

Signature: _____ Rank/Rate_____

APPENDIX B

Your station:

Your name:

Date:

Time:

Attitude Study

- a. These questions give you a chance to express your attitudes about some subjects which may be of concern to you.

- b. For each question place an X in the brackets above the statement which comes closest to expressing your belief or attitude.

READ EACH ITEM CAREFULLY, SINCE THE ORDER OF THE STATEMENTS VARY FROM ITEM TO ITEM.

- c. Your answers will be treated as confidential information by our research staff, and will be used only for research purposes.

1. Do your present duties employ your abilities in the best way for accomplishing the mission of this expedition?

() () () () ()

positively probably undecided probably not positively not

2. Do you think this climate is dangerous to your health?

() () () () ()

certainly probably undecided probably not certainly not

3. Are you now as happy from day to day as you were before beginning this expedition?

() () () () ()

much happier somewhat happier about the same somewhat less happy much less

4. Do you like the food here?

() () () () ()

almost always usually sometimes rarely almost never

5. Would you agree that your present mission is important enough to justify your spending all this time in the Antarctic.

() () () () ()

strongly agree agree undecided disagree strongly disagree

6. Do you wish you were back in the U. S.?

() () () () ()

almost never rarely sometimes usually almost always

7. At times I would rather be alone than with my group.

() () () () ()

strongly agree agree uncertain disagree strongly disagree

8. Have you had any pains as a result of the cold?

() () () () ()

many times at times uncertain probably not definitely not

9. Are the facilities for recreation at your station adequate?

() () () () ()

completely satisfactory satisfactory undecided unsatisfactory completely unsatisfactory

10. Does time pass too slowly?

() () () () ()

almost never rarely sometimes usually almost always

11. Everyone has a lot of respect for everyone else in my group.
 () () () () ()
 strongly agree agree am not sure disagree strongly disagree
12. The Navy does all it can to see that the men on this expedition are well cared for.
 () () () () ()
 strongly agree agree uncertain disagree strongly disagree
13. Do you think that when you get home you will be physically as well as you were before you left?
 () () () () ()
 certainly probably undecided probably not certainly not
14. Ten years from now do you expect to be ahead of or behind where you would have gotten if you had not gone on this expedition?
 () () () () ()
 far ahead somewhat ahead about the same somewhat behind far behind
15. Do you get hungry between meals?
 () () () () ()
 almost always usually sometimes rarely almost never
16. If you had it to do over again, would you rather come on this expedition than carrying out some other job?
 () () () () ()
 certainly probably undecided probably not certainly not
17. Do you wish you were aboard ship?
 () () () () ()
 almost always usually sometimes rarely almost never
18. What proportion of expedition members do you think would really prefer to be in the States?
 () () () () ()
 almost none about $\frac{1}{4}$ about $\frac{1}{2}$ about $\frac{3}{4}$ almost 100%
19. Do you wish you had more time to do all the things you want to do?
 () () () () ()
 almost never rarely sometimes usually almost always
20. I would rather be with my present group than with any other group that I know about.
 () () () () ()
 strongly agree agree uncertain disagree strongly disagree
21. Do you have as much confidence in the medical care here as you did in the States?
 () () () () ()
 much more more about the same less much less
22. Does your arctic clothing make you uncomfortable?
 () () () () ()
 almost never rarely sometimes usually almost always
23. How much of the knowledge you acquire on this expedition do you think you will be able to use after you return to the U. S.?
 () () () () ()
 all of it most of it some of it very little of it none of it

24. Do you get enough variety of your food?
 () () () () ()
 more than just about uncertain not quite not nearly
 enough enough enough enough enough
25. After you return to the U. S. do you intend to engage in activities related to polar explorations?
 () () () () ()
 positively will probably will undecided probably will not positively will not
26. Do you wish you had never come to the Antarctic?
 () () () () ()
 almost always usually sometimes rarely almost never
27. Do you feel that most of the leaders of this expedition are well qualified for the positions they hold?
 () () () () ()
 almost none of few of them about half the majority almost all
 them are are are are are
28. If you became seriously ill here, do you think you could get adequate help?
 () () () () ()
 certainly probably undecided probably not certainly not
29. Is there anyone in your group that is (or that you would like to have) as a very close friend?
 () () () () ()
 no one probably no one uncertain probably at least one certainly
30. The officer-in-charge at this station gets things across as well as can be expected.
 () () () () ()
 strongly agree agree undecided disagree strongly disagree
31. Does your arctic clothing interfere with the performance of your job?
 () () () () ()
 almost never rarely sometimes usually almost always
32. Is your family glad to have you on this expedition?
 () () () () ()
 very glad fairly glad do not care fairly unhappy very unhappy
 either way
33. Do you get enough sweet foods?
 () () () () ()
 not nearly not quite enough uncertain just about more than
 enough enough enough enough enough
34. I would just as soon have my present job as any other assignment that I know about.
 () () () () ()
 strongly agree agree undecided disagree strongly disagree
35. Do you wish you had your wife or sweetheart here?
 () () () () ()
 almost always usually sometimes rarely almost never

36. Are you bored?
☐ ☐ ☐ ☐ ☐
almost never rarely sometimes usually almost always
37. Several other men in my group are interested in the same things that I am.
☐ ☐ ☐ ☐ ☐
very true probably true not true, as far as I know probably not true false
38. The members of my group are the kind of people I like to spend a lot of time with.
☐ ☐ ☐ ☐ ☐
strongly agree agree uncertain disagree strongly disagree
39. Does the cold bother you?
☐ ☐ ☐ ☐ ☐
very much pretty much somewhat not as a rule not at all
40. Do you get enough to eat?
☐ ☐ ☐ ☐ ☐
more than enough just about enough uncertain not quite enough not nearly enough
41. Would you advise a friend who was considering joining a polar expedition to apply for the same job as you now hold?
☐ ☐ ☐ ☐ ☐
definitely yes probably yes uncertain probably not definitely not
42. Do you wish you could be home for just one day?
☐ ☐ ☐ ☐ ☐
almost never rarely sometimes usually almost always
43. How do you rate the total amount of confusion and mix-up in the organization of this expedition?
☐ ☐ ☐ ☐ ☐
much worse than most somewhat worse than most about average less confused than most much less confused than most
44. Do you find yourself in need of something to do in your spare time?
☐ ☐ ☐ ☐ ☐
almost never rarely sometimes usually almost always
45. Are there a lot of personal friends among the members of your group?
☐ ☐ ☐ ☐ ☐
all are good friends most are good friends some are good friends few are good friends almost no good friends
46. Do members of your group tend to think only of themselves, even on matters that affect all of you?
☐ ☐ ☐ ☐ ☐
almost always often sometimes rarely almost never
47. Do you like the cold weather?
☐ ☐ ☐ ☐ ☐
very much pretty much somewhat not as a rule not at all

48. Do you get enough fat foods?

()	()	()	()	()
more than enough	just about enough	uncertain	not quite enough	not nearly enough

49. Do you enjoy your daily contacts with members of your group as well as you enjoyed your contacts in the States?

()	()	()	()	()
much more	more	about the same	less	much less

50. Do you wish for more excitement?

()	()	()	()	()
almost always	usually	sometimes	rarely	almost never

51. Have you received sufficient training to enable you to survive in the Antarctic alone and with limited resources?

()	()	()	()	()
more than enough	just about enough	uncertain	not quite enough	not nearly enough

52. Would you like to have more work to do?

()	()	()	()	()
almost always	usually	sometimes	rarely	almost never

53. Does your arctic clothing tire you out more quickly?

()	()	()	()	()
almost always	usually	sometimes	rarely	almost never

54. Do you get enough meats?

()	()	()	()	()
more than enough	just about enough	uncertain	not quite enough	not nearly enough

55. Do you wish you could discover something important?

()	()	()	()	()
almost always	usually	sometimes	rarely	almost never

56. Do you think you would be found if you were lost here?

()	()	()	()	()
certainly	probably	undecided	probably not	certainly not

57. Do you miss having fresh fruit?

()	()	()	()	()
almost never	rarely	sometimes	usually	almost always

58. Do you wish you could stay in the Antarctic longer?

()	()	()	()	()
almost never	rarely	sometimes	usually	almost always

59. Does your clothing give you sufficient protection from the cold?

()	()	()	()	()
more than enough	just about enough	uncertain	not quite enough	not nearly enough

60. Would you like to go on another Arctic or Antarctic expedition?

()	()	()	()	()
certainly not	probably not	undecided	probably	certainly

APPENDIX C

Your station.

Your name:

Date:

Time:

GROUP BEHAVIOR DESCRIPTION

a. The items listed below describe some of the ways in which groups function as units.

b. For each item place an X in the brackets above the statement which most nearly applies to your group.

THE SAME STATEMENT IS NOT IN THE SAME PLACE FOR EACH ITEM,
READ EACH ONE CAREFULLY.

c. Your answers will be treated as confidential information by our research staff, and will be used only for research purposes.

d. When you finish, please check to see that you have answered every question.

1. Many in this group are afraid to say what they really think.

()	()	()	()	()
strongly agree	agree	uncertain	disagree	strongly disagree

2. We do a lot of bitching.

()	()	()	()	()
almost never	rarely	sometimes	usually	almost always

3. Somebody is ready to give you a hand, even without your asking.

()	()	()	()	()
almost never	rarely	sometimes	usually	almost always

4. This group does not accomplish much.

()	()	()	()	()
strongly agree	agree	uncertain	disagree	strongly disagree

5. We all call each other by our first names.

()	()	()	()	()
almost always	usually	sometimes	rarely	almost never

6. It's easy to get a good bull session going.

()	()	()	()	()
almost never	rarely	sometimes	usually	almost always

7. Everybody here follows a strict schedule of activities every day.

()	()	()	()	()
almost always	usually	sometimes	rarely	almost never

8. At times a bunch of us have a good laugh.

()	()	()	()	()
almost never	rarely	sometimes	usually	almost always

9. We do little things just to make somebody happy.

()	()	()	()	()
almost never	rarely	sometimes	usually	almost always

10. Everybody pulls together to get a job done.

()	()	()	()	()
almost never	rarely	sometimes	usually	almost always

11. We toss a coin or draw straws for assignments.
 () () () () ()
 almost always usually sometimes rarely almost never
12. Some do all the work here and others take all the credit.
 () () () () ()
 strongly agree agree uncertain disagree strongly disagree
13. Once we have completed a necessary task we can do whatever we like.
 () () () () ()
 almost never rarely sometimes usually almost always
14. Although we are together, no one says much.
 () () () () ()
 almost never rarely sometimes usually almost always
15. One or another of the guys is rubbing somebody the wrong way.
 () () () () ()
 almost always usually sometimes rarely almost never
16. We take a lot of pride in what this group has been able to achieve.
 () () () () ()
 strongly disagree disagree uncertain agree strongly agree
17. Privileges are determined by rank.
 () () () () ()
 almost never rarely sometimes usually almost always
18. We need fewer chiefs and more indians here.
 () () () () ()
 strongly disagree disagree uncertain agree strongly agree
19. We have to account for how we spend our time.
 () () () () ()
 almost never rarely sometimes usually almost always
20. This group is pretty happy.
 () () () () ()
 strongly disagree disagree uncertain agree strongly agree
21. It is hard to get a bunch of guys to agree on anything.
 () () () () ()
 almost never rarely sometimes usually almost always
22. It is pretty easy for this group to get something done.
 () () () () ()
 almost never rarely sometimes usually almost always
23. Decisions are made by a few members of the group.
 () () () () ()
 almost always usually sometimes rarely almost never
24. This would be a better group if we could eliminate a few members.
 () () () () ()
 strongly disagree disagree uncertain agree strongly agree

25. Everything we do is planned well ahead of time.
 () () () () ()
 almost always usually sometimes rarely almost never
26. There is a pretty good feeling between us here.
 () () () () ()
 almost never rarely sometimes usually almost always
27. It does not take much to get an argument started here.
 () () () () ()
 almost always usually sometimes rarely almost never
28. This group is confused and disorganized.
 () () () () ()
 almost always usually sometimes rarely almost never
29. At times part of the group is working at cross purposes with other parts of the group.
 () () () () ()
 almost always usually sometimes rarely almost never
30. Everyone here can have his say.
 () () () () ()
 almost always usually sometimes rarely almost never
31. This group is awfully dead.
 () () () () ()
 strongly disagree disagree uncertain agree strongly agree
32. Some of the men are shirking their duty.
 () () () () ()
 almost never rarely sometimes usually almost always
33. Not everyone has a clear idea of what job he is supposed to be doing.
 () () () () ()
 almost never rarely sometimes usually almost always
34. Members of the group bicker with each other
 () () () () ()
 almost always usually sometimes rarely almost never
35. Everyone's opinion counts as much as the next man's.
 () () () () ()
 strongly agree agree uncertain disagree strongly disagree
36. We sit around feeling sorry for ourselves.
 () () () () ()
 almost always usually sometimes rarely almost never
37. Members of this group work well together as a team.
 () () () () ()
 almost never rarely sometimes usually almost always
38. Some members of the group don't really know what they are here for.
 () () () () ()
 strongly agree agree uncertain disagree strongly disagree

39. If any one of us slips up, he can get the whole group into trouble.
 () () () () ()
 strongly agree agree uncertain disagree strongly disagree
40. The group as a whole makes important decisions.
 () () () () ()
 almost never rarely sometimes usually almost always
41. Everyone here would feel ashamed if we did not accomplish our mission.
 () () () () ()
 strongly agree agree uncertain disagree strongly disagree
42. This group has more than its share of odd-balls.
 () () () () ()
 strongly agree agree uncertain disagree strongly disagree
43. Members of this group have many common interests.
 () () () () ()
 strongly agree agree uncertain disagree strongly disagree

APPENDIX D

STANDARD PSYCHODIAGNOSTIC RECORD BOOKLET

IP Communication

Sports Inventory

Developed by
Staff, Mediopsychological Research Corp.

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STANDARD PSYCHODIAGNOSTIC RECORD BOOKLET

IP Communication

Sports Inventory

Developed by
Staff, Mediopsychological Research Corp.

Name _____ Age _____ Sex . _____
yrs.-mos.

Present Address _____

Doctor _____ Affiliation _____

Examiner _____ Date _____

- *10. When the batter assumes his natural stance in baseball, the strike zone is that space over home plate which is between:
 - 1. his eye level and waist line.
 - 2. his eye level and the top of his knees.
 - 3. his arm-pits and the top of his knees.
 - 4. the top of his shoulders and the bottom of his knees.
- *11. When a tennis game stands at deuce a player may win the game by:
 - 1. winning the next stroke.
 - 2. winning the next two strokes in a row.
 - 3. serving an ace.
 - 4. decision of an umpire.
- *12. Simultaneous and symmetrical action of the arms and legs is necessary to execute the:
 - 1. standing high jump in track.
 - 2. rope climb.
 - 3. crawl in swimming.
 - 4. breast stroke in swimming.
- *13. The number of lateral passes which may be thrown in succession in a football game is:
 - 1. one.
 - 2. two.
 - 3. three.
 - 4. unlimited.
- *14. In baseball, if the catcher fails to catch the ball after the first batsman's third strike, the batter:
 - 1. is out, nevertheless.
 - 2. may run to first base.
 - 3. is passed safely to first base.
 - 4. is allowed an extra strike.
- *15. In skiing nomenclature, slalom means to:
 - 1. jump over obstacles.
 - 2. travel cross country.
 - 3. go uphill.
 - 4. race in a zig-zag downhill course.
- 16. A scrimmage in football does not necessarily end when the player carrying the ball:
 - 1. is forced out of bounds.
 - 2. falls so that only one knee touches the ground.
 - 3. fumbles and recovers the ball.
 - 4. carries the ball over the goal line.
- *17. A boxer does not commit a foul by:
 - 1. hitting with an open glove.
 - 2. holding an opponent with one hand and hitting with the other.
 - 3. going down without being hit
 - 4. delivering hook blows.
- *18. A strike does not occur in baseball when the ball:
 - 1. is bunted foul.
 - 2. becomes a foul tip.
 - 3. is fouled by a batter with two strikes on him.
 - 4. hits the batter's clothing as he strikes at it.

- * 1. In football, no one may be tackled except the:
 - 1. man with the ball.
 - 2. backfield players.
 - 3. backfield players on the offensive team.
 - 4. offensive team.
- * 2. In baseball, a base runner must be tagged with the ball to be put out:
 - 1. if he is returning to a base after a fly is caught.
 - 2. at first base.
 - 3. when attempting to steal a base.
 - 4. when he is forced to advance to make room for a batsman who has made a fair hit.
- 3. The receiver wins the point in tennis if the:
 - 1. ball served touches the net.
 - 2. ball hits within the service court diagonally opposite the service point.
 - 3. server serves a fault.
 - 4. server serves two consecutive faults.
- * 4. In basketball, the ball is put into play at the beginning of the game by a play called a:
 - 1. scrimmage.
 - 2. face-off.
 - 3. toss-up.
 - 4. pass in.
- * 5. If a bowler steps across the foul line while bowling a ball:
 - 1. this counts as a ball bowled by the bowler but no score is made by it.
 - 2. this does not count as a ball bowled by the bowler and no score is made by it.
 - 3. the score on this ball counts but the next ball may not be bowled.
 - 4. a penalty of ten points results.
- * 6. If a wrestler forces his opponent on his back so as to make the two shoulders touch the mat at the same time it is called a:
 - 1. pin fall.
 - 2. full nelson.
 - 3. body slam.
 - 4. hammerlock.
- 7. The contestant in the running broad jump must jump from behind the scratch line but he is allowed to run:
 - 1. ten yards.
 - 2. twenty yards.
 - 3. twenty-five yards.
 - 4. as far as he pleases.
- 8. In attempting to return the ball in handball the ball may be struck:
 - 1. as many times as necessary with both hands.
 - 2. as many times as necessary with only one hand.
 - 3. once with each hand.
 - 4. once with one hand only.
- * 9. In general, when the offensive side is penalized in football:
 - 1. a down is lost.
 - 2. the place to be reached for a first down remains the same.
 - 3. they lose the ball to the other team.
 - 4. it is to the defensive side's advantage to refuse the penalty.

- *19. A perfect score for a bowling game is:
1. 21.
 2. 100.
 3. 300.
 4. indeterminant.
20. In touch football, any player on the offensive team may:
1. attempt the point after touchdown.
 2. recover a fumbled pass from center.
 3. receive a pass from another passer.
 4. throw a forward pass from any point.
21. Points are scored by both the serving and receiving side in:
1. tennis.
 2. badminton.
 3. volleyball.
 4. handball.
- *22. If the pitcher commits a balk in baseball:
1. base runners are advanced one base.
 2. an error is recorded against the pitcher.
 3. the batsman is passed safely to first base.
 4. no penalty occurs.
23. In golf, the green is considered to be:
1. within twenty yards of the hole being played except for hazards.
 2. all ground except hazards.
 3. the fairway.
 4. the surface of the bunkers.
- *24. So long as the goalkeeper on a soccer team does not pass outside his goal area he may legally prevent the ball from going between the goal:
1. only by using his feet.
 2. only by using his feet and legs.
 3. by using any part of his body except his hands.
 4. by using any part of his body
- *25. All ten pins knocked down with two balls in a frame of bowling is called a:
1. strike.
 2. spare.
 3. safety.
 4. split.
26. How many hurdles may be knocked over without forfeiting the 220-yard hurdle race?
1. none.
 2. one.
 3. three.
 4. all of them.
- *27. A basketball player is permitted to:
1. ram an opponent with the shoulder.
 2. handle the ball with both hands simultaneously while dribbling.
 3. put his arms around an opponent.
 4. turn around with the ball without making progress.

- *28. In volleyball, the ball must be returned before it has been touched:
1. two times.
 2. three times.
 3. four times.
 4. five times.
- *29. The stroke used most often for speed in competition swimming is the:
1. breast.
 2. crawl.
 3. back.
 4. side.
- *30. In table tennis the change of service ordinarily occurs:
1. at the end of each game.
 2. after each point.
 3. after each five points.
 4. after each ten points.
- *31. In basketball, the ball may be legally:
1. rolled on the floor.
 2. struck with closed fists.
 3. kicked.
 4. bounced out of bounds, so long as the player is in bounds.
- *32. The ball that should be played in golf after teeing off is the one:
1. of the player with the highest score.
 2. of the player with the lowest score.
 3. nearest to the hole.
 4. farthest from the hole.
- *33. In tennis, the word "love" refers to:
1. a tie score.
 2. no score.
 3. a good service.
 4. a bad service.
34. The hammerhead in the hammer throw must fall:
1. within a 45 degree sector marked on the ground.
 2. within a 90 degree sector marked on the ground.
 3. within a circular target marked on the ground.
 4. beyond a straight line marked on the ground.
35. Which one of the following weapons is not used in fencing?
1. sword.
 2. foil.
 3. epe'e.
 4. sabre.
36. In delivering the service in tennis, the server stands:
1. behind the left court.
 2. behind the right court.
 3. alternately behind the left and right courts—beginning from the left in each game.
 4. alternately behind the left and right courts—beginning from the right in each game.

37. In archery, shooting arrows with the object of dropping them into a target laid out on the ground is called:
1. flight shooting.
 2. clout shooting.
 3. wand shooting.
 4. dart shooting.
38. A Lacrosse team is composed of:
1. eight players.
 2. nine players.
 3. ten players.
 4. eleven players.
39. A boxer or wrestler weighing 148 pounds is classified as:
1. feather weight.
 2. light weight.
 3. welter weight.
 4. middle weight.
- *40. In ice hockey, following a foul the puck is:
1. iced.
 2. centered.
 3. faced off.
 4. stick handled.
- *41. A base runner is allowed to take his foot from the base before the ball has been pitched in:
1. baseball but not in softball.
 2. softball but not in baseball.
 3. both softball and baseball.
 4. neither softball nor baseball.
- *42. A birdie in golf refers to:
1. a score made on a hole one under par.
 2. a score made on a hole two under par.
 3. a ball which has been sliced.
 4. an iron used to get out of the rough.
- *43. In football, a safety is scored when a player with the ball:
1. kicks it between the goal posts.
 2. is downed behind his own goal line, provided the ball is put in play by the opposing team.
 3. is downed behind his own goal line, provided the ball is put in play by his own team.
 4. fumbles behind his own goal line and the ball is recovered by the opposing team.
- *44. A softball game is officially played by:
1. nine men for seven innings.
 2. nine men for nine innings.
 3. ten men for seven innings.
 4. ten men for nine innings.

- *45. The players on an ice hockey team who are eligible to score are the:
1. forwards.
 2. wing players.
 3. forwards and defense men.
 4. forwards, defense men and goal tender.
46. In archery, a number of arrows shot at fixed distances is termed a:
1. round.
 2. quiver.
 3. sheaf.
 4. flight.
47. In fencing, the counter-attacking action of the defender which follows a successful parry of the attack is termed the:
1. counterparry.
 2. riposte.
 3. remise.
 4. stop.
48. In pole vaulting, after an individual leaves the ground:
1. the upperhand may be raised on the pole.
 2. the upper hand may be raised on the pole, but the lower hand may not be raised above the upper.
 3. the upper hand may not be raised on the pole, but the lower hand may not be raised above the upper.
 4. the upper hand may not be raised on the pole, and the lower hand may not be raised above the upper.
- *49. A game of soccer begins by:
1. a member of each team facing-off.
 2. a kick from the center of the field.
 3. a free-kick from one goal line.
 4. the ball being thrown in from the side line.
- *50. If both object balls are hit with the cue ball in billiards it is termed a:
1. bank.
 2. double.
 3. talley
 4. carom

APPENDIX E

NavMed Res Form 3

Rev 9-1-56

PSYCHIATRIC EVALUATION FORM

Name _____ Rank/Rate _____ Section _____ Date _____

Candidates Potential Effectiveness for Operation Deepfreeze:

1	2	3	4	5
UNACCEPTABLE	INFERIOR	AVERAGE	SUPERIOR	OUTSTANDING

Brief Subjective Summary:

Diagnosis (If Appropriate):

	Neuropsychiatrist (MD)			
A. Motivation for present objective	1	2	3	4
B. Ability to function in a group	1	2	3	4
C. Ability to communicate	1	2	3	4
D. Ability to withstand stress	1	2	3	4
E. Ability to cope with depression	1	2	3	4
F. Ability to cope with aggression	1	2	3	4
G. Expression of overt hostility	1	2	3	4
H. Expression of overt anxiety	1	2	3	4

NEUROTIC SYMPTOM CHECKLIST

APPENDIX G
CIRCLE CORRECT ANSWER*

- | | | |
|--|-----|----|
| 1. Are you in good health? | YES | NO |
| 2. Have you ever been suspended or expelled from school? | YES | NO |
| 3. Are you able to work every day? | YES | NO |
| *4. Do people usually misunderstand you? | YES | NO |
| *5. Do you suffer from frequent severe headaches? | YES | NO |
| *6. Do you often have trouble getting to sleep? | YES | NO |
| 7. Have you ever had a fit or convulsion? | YES | NO |
| *8. Are you considered a nervous person? | YES | NO |
| 9. Have you ever been arrested? | YES | NO |
| *10. Do people you know frequently dislike you? | YES | NO |
| *11. Are you troubled by stuttering or stammering? | YES | NO |
| *12. Are you frequently bothered by back pains? | YES | NO |
| *13. Do you often have spells of dizziness? | YES | NO |
| *14. Do you wet the bed? | YES | NO |
| *15. Have you ever been treated by a doctor for nervousness? | YES | NO |
| *16. Have you ever had a nervous breakdown? | YES | NO |
| *17. Do you often feel miserable and blue? | YES | NO |
| *18. Do you have any unusual fears? | YES | NO |
| *19. Do you frequently have a stomach upset? | YES | NO |
| *20. Do you get spells of exhaustion and fatigue? | YES | NO |
| *21. Are you a sleep walker? | YES | NO |

NAME & TITLE

* Items included in the scoring key are indicated by an asterisk before the item number. The responses circled indicate the "neurotic" response as determined by a consensus of the authors

APPENDIX F.

MONTHLY HEALTH DIARY

YOUR NUMBER _____

INSTRUCTIONS

We are extremely interested in determining all possible ways of making life during Deepfreeze Operations more pleasant. Our regular habits, discomforts, pleasures, and so on, provide important clues for improving living conditions.

On the following pages are a series of questions about these matters. Beside each question is a scale with points corresponding to different answers.

We are asking you to check each scale as **ACCURATELY** as possible. Check the dotted line opposite the statement which **ACCURATELY** answers the question for you at this time. Answer each question on the extreme right. We would greatly appreciate your honest answers each time these questions are answered.

This is a monthly health diary. It is very vital information and will be treated as **HIGHLY CONFIDENTIAL**. This information will **NOT** influence administrative decisions as to promotions, transfers, etc.

THANK YOU FOR YOUR COOPERATION.

ADDITIONAL INSTRUCTIONS

Since this is your monthly health diary, it is important to record any unusual event that may explain your answer to a particular question during a particular period.

To record such unusual events, circle the check (✓) for your answers to the particular questions, **THEN** record the events in as much detail as you like on the blank sheets provided for this purpose at the end of the booklet. Please put the date the event occurred near your record of the event.

Your Number		Re													Start	
Month	Year	Month	14	13	12	11	10	9	8	7	6	5	4	3	2	Year
Time																
*II. Sleeping habits in the past month.																
(a) How many hours of sleep do you usually get a night?																
More than 8 hours																
8 hours																
6-7 hours																
4-5 hours																
2-3 hours																
* (b) How long does it take you to fall asleep?																
60 min. or more																
30 min.																
15 min.																
5 min.																
2 min. or less																
(c) During a night's sleep do you usually																
Sleep the night through																
Awaken once a night																
Awaken twice a night																
Awaken more than twice a night																

		Your Response												Start	
		Month	14	13	12	11	10	9	8	7	6	5	4		3
*II. (continued)															
(d) How much do you usually dream while sleeping?															
Dream all night															
3 dreams															
2 dreams															
1 dream															
No dreams at all															
(e) If you dreamed at all, how pleasant or unpleasant were your dreams?															
Very pleasant															
Somewhat pleasant															
Neither pleasant nor unpleasant															
Somewhat unpleasant															
Very unpleasant															
*(f) How long does it take you to feel wide awake?															
60 min. or more															
30 min.															
15 min.															
5 min.															
2 min. or less															

Your Number	R e t u r n	S t a r t												
		14	13	12	11	10	9	8	7	6	5	4	3	2
Month														
Time														
*II. (continued)														
(g) During the past month, when awakening, how irritable have you felt?														
Very irritable														
Moderately irritable														
Slightly irritable														
Not irritable.														
*III. Other Daily Habits.														
(a) How often do you usually urinate in 24 hours?														
15 or more times														
12 times														
8 times														
4 times														
2 times or less														
* (b) How often do your bowels usually move in 24 hours?														
4 or more times														
3 times														
2 times														
1 time														
Once every other day														

Your Number		Return												Start	
Month	Year	14	13	12	11	10	9	8	7	6	5	4	3	2	
Time															
IV. How have you been feeling the past month?															
(a) Had any headaches?															
If so, how long have they lasted?															
8 or more hours															
4-6 hours															
2-3 hours															
1 hour or less															
No headaches															
* (b) If you have had headaches, how severe have they been?															
Extremely painful															
Painful															
Quite annoying															
Slightly annoying															
Hardly noticed the pain															
(c) Again, if you have had headaches, what time of the day does the pain seem to be the most annoying?															
0600-0900															
0900-1200															
1200-1800															
1800-2400															
0100-0600															

Your Number		R e t	S t a r t													
Month	u r n	14	13	12	11	10	9	8	7	6	5	4	3	2		
Time																
IV. (Continued)																
(d) Have you done anything for your headaches?																
Other treatment																
Aspirin																
Taken APC																
Hit the bunk																
Nothing																
(e) Have you noticed any unpleasant feelings in your stomach region? If so, how severe have they been?																
Very severe																
Severe																
Moderate																
Very slight																
Haven't had any																
*(f) In general, how tense or relaxed have you been in the past month?																
Always very tense, never able to relax																
Usually tense																
Neither tense nor relaxed																
Relaxed, but not sleepy																
Very relaxed, somewhat sleepy																

10 10 10 10 10 10 10 10 10 10 10 10 10 10 10

		Your Rating													Start	
		Month	14	13	12	11	10	9	8	7	6	5	4	3		2
*IV. (Continued)																
(g) How do you feel about having volunteered for this duty?																
Very pleased																
Somewhat pleased																
Neither pleased nor displeased																
Very displeased																
* (h) How do you rate your present living conditions?																
Excellent																
Good																
Fair																
Poor																
Very poor																
(i) Do you think your pay for Operation Deep-freeze II is—																
Excellent																
Good																
Fair																
Poor																
Very poor																

11 11 11 11 11 11 11 11 11 11 11 11 11 11 11

Your Number	R e t u r n												S t a r t
	Month	14	13	12	11	10	9	8	7	6	5	4	
Time													
*IV. (continued)													
(j) In general, how tired have you been the past month?													
<div>Much more than usual</div> <div>Somewhat more than usual</div> <div>About as usual</div> <div>Somewhat less than usual</div> <div>Much less than usual</div>													
*(k) How would you describe the mood you have been in the past month?													
<div>Very happy</div> <div>Somewhat happy</div> <div>No more happy than unhappy</div> <div>Somewhat unhappy</div> <div>very unhappy</div>													
*(l) Have you noticed any dizziness, blurring of eyes, etc. in the past month? If so, how severe has it been?													
<div>Extremely severe</div> <div>Severe</div> <div>Moderate</div> <div>Very slight</div> <div>None, whatsoever</div>													

12 12 12 12 12 12 12 12 12 12 12 12 12 12

Your Number		Return	Month	14	13	12	11	10	9	8	7	6	5	4	3	2	Start
Time																	
*IV. (continued)																	
(m) Have you noticed any unsteadiness of your hands in the past month?																	
Great amount																	
Some																	
Slight																	
Very slight																	
None, whatsoever																	
* (n) Have you noticed your heart beating loudly in the past month?																	
Very frequently																	
Frequently																	
Occasionally																	
Very seldom																	
Never																	
* (o) Has it been difficult for you to breathe at times during the past month?																	
Very difficult																	
Quite difficult																	
Somewhat difficult																	
Slightly difficult																	
Not at all difficult																	

13 13 13 13 13 13 13 13 13 13 13 13 13 13 13 13 13

Your Rating		Month														Start
Month	Year	14	13	12	11	10	9	8	7	6	5	4	3	2		
*V. How has your duty been going the past month?																
(a) How would you say your overall efficiency has been?																
Much more efficient than usual																
More efficient than usual																
As efficient as usual																
Less efficient than usual																
Much less efficient than usual																
* (b) Have you felt interested in the duties you have performed the past month?																
Very interested																
Somewhat interested																
No more interested than disinterested																
Somewhat disinterested																
Very disinterested																
* (c) If you were in a position to CONTINUE on Deepfreeze as planned or TERMINATE your duty as soon as possible, what would you FEEL like doing?																
Feel very much like staying																
Feel a little like staying																
No feelings either way																
Feel a little like quitting																
Feel very much like quitting																

		R e t u r n													S t a r t
Your Number		Month	14	13	12	11	10	9	8	7	6	5	4	3	2
Time															
*V. (continued)															
(d) How difficult have you found it to concentrate on a task the past month?															
Much more difficult than usual															
More difficult than usual															
No more difficult than usual															
Less difficult than usual															
Much less difficult than usual															
*VI. In general, how have you been getting along with your shipmates the past month?															
(a) In general, how irritable have you been in your relations with your shipmates?															
Much more than usual															
More than usual															
No more than usual															
Less than usual															
Much less than usual															
*(b) Have you felt like chatting and joking with your shipmates?															
Much more than usual															
More than usual															
As much as usual															
Less than usual															
Much less than usual															

15 15 15 15 15 15 15 15 15 15 15 15 15 15 15 15

		Your Rating												Start		
		Month	14	13	12	11	10	9	8	7	6	5	4	3	2	
*VI. (continued)																
(c) In general, how friendly have your shipmates been reacting to you?																
	Much more than usual															
	More than usual															
	About as friendly as usual															
	Less than usual															
	Much less than usual															
*VII. Smoking Habits.																
(a) How many cigarettes do you smoke each day?																
	Over a pack															
	About a pack															
	About 1/2 pack															
	Less than 1/2 pack															
	None															
(b) How many cigars do you smoke each day?																
	10 or over															
	7-8															
	5-6															
	3-4															
	1-2															
	Only occasionally															
	Never															

16 16 16 16 16 16 16 16 16 16 16 16 16 16 16 16

Your Number		R e s p o n s e	Month												S t a r t
			14	13	12	11	10	9	8	7	6	5	4	3	2
Time															
*VII. (continued)															
(c) How many pipefuls of tobacco do you smoke each day?															
Over 8.															
8															
6															
4															
2															
Only occasionally															
Never															
*(d) Do you feel that your smoking has increased in the past month?															
Yes															
No															
Don't know															
(e) Do you routinely smoke before breakfast?															
Yes															
No															
(f) How many years have you been smoking?															
Over 10 years															
5-10 years															
2-4 years															
1 year															
Less than a year															
Not at all															

17 17 17 17 17 17 17 17 17 17 17 17 17 17 17 17

Your Number		Return	14	13	12	11	10	9	8	7	6	5	4	3	2	Start
Time																
VII. (continued)																
(g) Do you chew tobacco?																
Yes, routinely																
Occasionally																
Never																
*VIII. General.																
(a) Have you felt homesick the past month?																
Very homesick																
Quite homesick																
Somewhat homesick																
Very slightly homesick																
Not at all																
(b) In the past month, during the times when you were the most HOMESICK, how have you characteristically relieved this HOMESICKNESS? (Please check as many as apply)																
Never homesick																
Wrote home																
Went to movies, played cards, etc.																
"Shot-the-Bull" with shipmates																
Went off by myself																
Went to sleep																
Forgot it when I got to work																
Did nothing																

18 18 18 18 18 18 18 18 13 18 18 13 18 18 18

Your Number		Re e t												S t a r t	
Month	u r n	14	13	12	11	10	9	8	7	6	5	4	3		2
Time															
*VIII. (continued)															
(c) How did you enjoy the movies seen in the past month?															
Enjoyed them very much															
Enjoyed them a little															
Did not enjoy them at all															
Didn't go															
Weren't any															
(d) How have you enjoyed recreational facilities offered you?															
Enjoyed them very much															
Enjoyed them a little															
Did not enjoy them at all															
Didn't use them															
Weren't any															
* (e) Have you enjoyed playing cards or other games with your shipmates the past month?															
Enjoyed it very much															
Enjoyed playing															
Played, but didn't enjoy it															
Didn't play															
No time to play															

19 19 19 19 19 19 19 19 19 19 19 19 19 19 19

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Rpt. No. 5 on Subtask (3) of Bureau of Medicine and Surgery Research Task MK005.14-2100-3, 24 pp., plus V, 13 tables, 6 refs., and 7 appendices.

The predictive validity of several psychometric tests as well as trait ratings by teams of psychologists and psychiatrists were examined with respect to criteria of adjustment to the Antarctic during the "wintering-over" period of 1957. Thirty-three subjective symptoms reported monthly together with three other attitudinal criteria were intercorrelated and factor analyzed. The total N was 109. Factor scores computed for each of the five factors extracted from this matrix as adjustment criteria. It was found that men with the following characteristics had the greatest adjustment potential for the Antarctic conditions: high intelligence test scores, low interest in organized sports, rated high with respect to "ability to communicate", low with respect to "avert hostility", high with respect to "ability to cope with aggression", to have less than a college education, to be single and over 25 years of age, and to have come from the southern section of the U. S. The methodological importance of the application of factor analytic techniques to repetitively collected subjective data is emphasized.

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